NEAX Express

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User's Guide

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Equipment Log

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Using This Guide

This User's Guide provides a quick reference to information about your system. Its goal is to familiarize you with your system and the tasks necessary for system configuring and upgrading.

This guide contains the following information:

- Chapter 1, **"**System Overview" provides an overview of your system and describes your system's major system components. See this chapter to familiarize yourself with your system.
- Chapter 2, "Setting Up Your System" tells you how to select a site, unpack the system, make cable connections, and power on your system.
- Chapter 3, "Configuring Your System" tells you how to configure the system and provides instructions for running the BIOS Setup Utility and the Adaptec Configuration Utility, which is used to configure SCSI devices in your system. This chapter also provides information on system board jumper settings.
- Chapter 4, "Upgrades and Options" provides you with instructions for upgrading your system with an additional processor, optional memory, options cards, and peripheral devices.
- Chapter 5, "Problem Solving" contains helpful information for solving problems that might occur with your system.
- Appendix A, "System Cabling" includes cabling information for the two onboard SCSI controllers and the onboard IDE controllers.
- Appendix B, "System Setup Utility" provides information for configuring onboard resources and add-in boards. It also provides information on viewing the system event log.
- Appendix C, "Emergency Management Port" provides information on a feature that provides an interface to the Emergency Management Port (EMP) Console Manager. This interface allows remote server management via a modem or direct connection.
- Appendix D, "Platform Event Paging" provides information and operating instructions on a feature that allows your server to be configured to automatically dial up a paging service and page you when a server management related event occurs.
- "Glossary" defines the standard acronyms and technical terms used in this manual.
- "Equipment Log" provides you with a sample equipment log for documenting the system configuration and future updates you may make to your system.

Text Conventions

This guide uses the following text conventions.

Warnings, cautions, and notes have the following meanings:

WARNING

Warnings alert you to situations that could result in serious personal injury or loss of life.

CAUTION

Cautions indicate situations that can damage the system hardware or software.

Note: Notes give important information about the material being described.

- Names of keyboard keys are printed as they appear on the keyboard. For example, **Ctrl**, **Alt**, or **Enter**.
- Text or keystrokes that you enter appear as boldface type. For example, type **abc123** and press **ENTER**.
- File names are printed in uppercase letters. For example, AUTOEXEC.BAT.

Related Documents

In addition to this guide, the following system document is shipped with your server.

- *System Release Notes*
  Release Notes provide you with the latest information about your system.

Safety Notices

- **Caution:** To reduce the risk of electric shock which could cause personal injury, follow all safety notices. The symbols shown are used in your documentation and on your equipment to indicate safety hazards.
- **Warning:** Lithium batteries can be dangerous. Improper handling of lithium batteries may result in an explosion. Dispose of lithium batteries as required by local ordinance or as normal waste if no local ordinance exists.
- **Warning:** The detachable power supply cords are intended to serve as the disconnect devices.
- **Warning:** This equipment has a 3-wire, grounded power cords. To prevent electrical hazards, do not remove or defeat the ground prong on the power cords. Replace a power cord if it gets damaged. Contact your dealer for an exact replacement.
- **Warning:** The DC push-button on/off switch on the front panel does not turn off the system AC power. Also, +5vdc is present on the system board whenever the AC power cords are connected between the system and an AC outlet. Before doing the procedures in this manual, make sure that your system is powered off and unplug the AC power cords from the back of the chassis. Failure to disconnect power before opening your system can result in personal injury and equipment damage.

In the U.S.A. and Canada, the power cord must be a UL-listed detachable power cord (in Canada, CSA-certified), type ST or SJT, 16 AWG, 3-conductor, provided with a molded-on NEMA type 5-15 P plug cap at one end and a molded-on cord connector body at the other end. The cord length must not exceed 9 feet (2.7 meters).

Outside the U.S.A. and Canada, the plug must be rated for 250 VAC, 10 amp minimum, and must display an international agency approval marking. The cord must be suitable for use in the end-user country. Consult your dealer or the local electrical authorities if you are unsure of the type of power cord to use in your country. The voltage change occurs via a switch in the power supply.

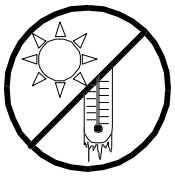
- **Warning:** Under no circumstances should the user attempt to disassemble the power supply. The power supply has no user-replaceable parts. Inside the power supply are hazardous voltages that can cause serious personal injury. A defective power supply must be returned to your dealer.

Safety Notices for Users Outside of the U.S.A. and Canada

- **PELV (Protected Extra-Low Voltage) Integrity:** To ensure the extra-low voltage integrity of the equipment, connect only equipment with mains-protected electrically-compatible circuits to the external ports.
- **Remote Earths:** To prevent electrical shock, connect all local (individual office) computers and computer support equipment to the same electrical circuit of the building wiring. If you are unsure, check the building wiring to avoid remote earth conditions.
- **Earth Bonding:** For safe operation, only connect the equipment to a building supply that is in accordance with current wiring regulations in your country. In the U.K., those regulations are the IEE.

Care and Handling

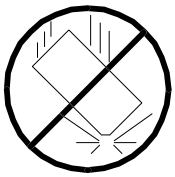
Use the following guidelines to properly handle and care for your system.



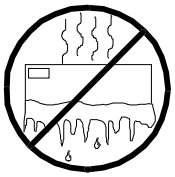
Protect the system from extremely low or high temperatures. Let the system warm (or cool) to room temperature before using it.

Keep the system away from magnetic forces.

Keep the system dry. Do not wash the system with a wet cloth or pour fluid into it.



Protect the system from being bumped or dropped.



Check the system for condensation. If condensation exists, allow it to evaporate before powering on the system.

Keep the system away from dust, sand, and dirt.

1

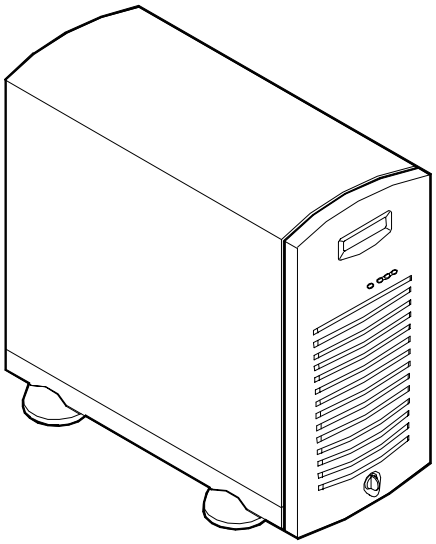
System Overview

- Overview
- System Chassis
- Power Supply
- Peripheral Bays
- SAF-TE (SCSI Accessed Fault Tolerant Enclosure) Board
- System Board Features
- Emergency Management Port Console
- Platform Event Paging
- System Security

Overview

This server is a modular, multiprocessing server based on the Intel® Pentium® II and Pentium® III chip sets. The combination of compute performance, memory capacity, and integrated I/O provides a high performance environment for many server market applications.

This server is also conveniently housed in a tower-based, as shown below.



Tower-Based System Front View

This server system is designed for minimum downtime. To this end, the server includes or has the options to include the following:

- Optional power system redundancy; in a system configured with two power supplies, the system will continue to operate with a single power supply failure.
- Self-contained power supply units that can be easily installed or removed from the back of the chassis.
- SCSI drive bays accessible from the front of the chassis.
- Hot-swap SCSI disk drive backplane; a failed drive can be removed and a new drive installed without system power being turned off, if an optional Redundant Array of Independent Disks (RAID) controller is installed.
- High degree of SCSI disk fault tolerance and advanced disk array management features through the use of RAID technology, if an optional RAID controller is installed.
- Chassis that supports up to two power supplies. The second power supply can be added to provide redundant power.

As application requirements increase, you can expand your server with an additional processor, additional memory, add-in boards and peripheral devices: tape devices, CD-ROM, diskette drives and hard disk drives.

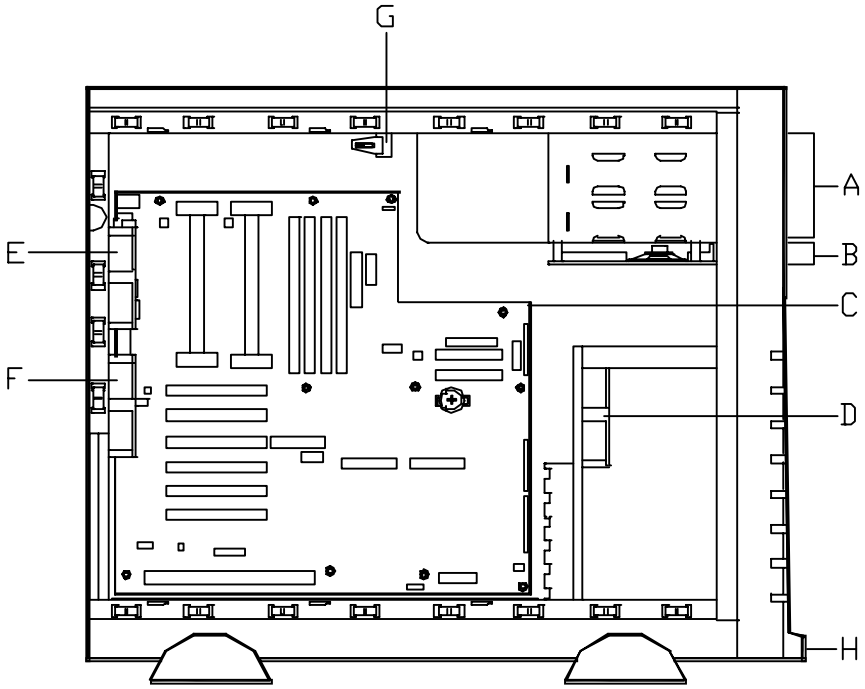
Your server features the following major components:

- Single or dual high-performance processors packaged in either Single Edge Contact Cartridge (SECC) or Single Edge Contact Cartridge 2 (SECC2) packages.
- 32 MB to 1 GB of memory, using up to four unbuffered DIMMs. Memory is partitioned as four banks of SDRAM DIMMs, each providing 72 bits of noninterleaved memory (64 bit main memory plus ECC).
- Four PCI (33/32 bit) expansion slots for add-in boards. 1x32 bit PCI bus. Two PCI (66/32) 5V expansion slots (backwards compatible to PCI 33/32 bit.)
- One ISA expansion slot for add-in board. Embedded PC-compatible support (serial, parallel, mouse, keyboard, diskette, and Plug and Play features).
- Server Management that includes:
  - — Thermal/voltage monitoring and error handling.
  - — Real time clock/calendar (RTC).
  - — Front panel controls and indicators (LEDs).
  - — System Setup Utility (SSU).
  - — Basic Input/Output System (BIOS), Power On Self Test (POST), and Setup stored in flash memory.
- Integrated onboard Cirrus Logic CL-GD5480 Super Video Graphics Array (SVGA) controller with 2 MB of 10 ns onboard SGRAM (Synchronous Graphics Memory) video memory.
- Adaptec AIC-7896, supporting onboard Ultra2 (LVDS) Wide and Ultra-Wide SCSI interfaces.
- Integrated onboard Network Interface Controller (NIC), an Intel 82559 PCI LAN controller for 10 or 100 Mbps TX Fast Ethernet networks. RJ-45 Ethernet connector with indicator LEDs for I/O backpanel.
- Dual Channel enhanced IDE controller.
- Chassis that holds up to 12 drives: seven hot-swap bays for ultra-2 (LVD) SCSI hard drives; five removable media expansion bays with a CD-ROM reader already installed in one bay; and a half-height bay with a diskette drive already installed in the bay.
- Seven hot-swap SCSI hard disk drive bays accessible from the front of the chassis. The bays are secured behind a lockable front door where the drives can be swapped in or out of the system without powering it down, if RAID is configured in the system.
- SCSI backplane is Ultra-2 (LVD) ready.

- Integrated dual Universal Serial Bus (USB) ports.
- One standard power supply module with a slot available for an additional redundant power supply module. When an additional power supply module is installed, both the standard and additional redundant power supply module slots become hot swappable.
- Hardware monitors (temperature, fans, and voltage) and software monitors to indicate failures.
- Mechanical: Keylock at the front of the chassis and two metal padlocks loops (one at the back of each side panel). One intrusion sensor switch for the front of the chassis. Two interlock sensor switches for the left and right side of the chassis.

System Chassis

The system chassis is an easy-to-expand, fabricated metal structure. The major system components are shown in the following illustrations.



System Chassis (Left Side View)

A. Removable media bays (2)

B. Speaker/Switch assembly

C. System board

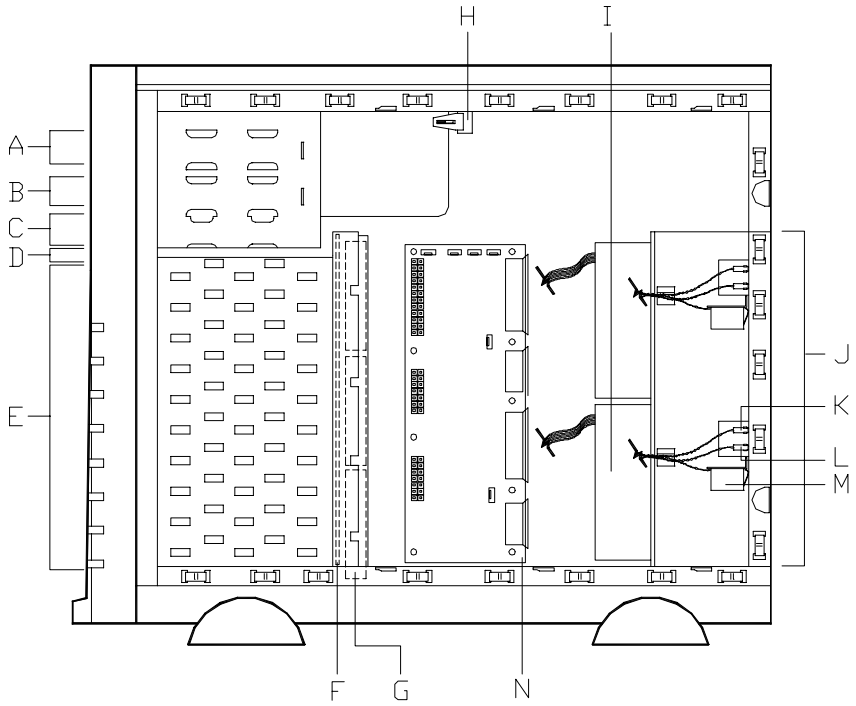
D. Front input fan

E. Rear exhaust fan

F. Second rear exhaust fan

G. Interlock switch - Side Covers

H. Intrusion keylock switch - Front Cover



System Chassis (Right Side View)

A. CD-ROM drive

B. Removable media bay

C. 1.44 MB 3.5"diskette drive

D. SAF-TE board

E. SCSI disk drive bays (7)

F. SCSI backplane board

G. Fans, behind SCSI disk drive bays (3 standard)

H. Interlock switch

I. Standard power supply

J. Power supply module slots (one standard power supply slot and one optional power supply slot)

K. Power supply status LED

L. DC power LED

M. Power available switch

N. Power supply distribution board

Power Supply

The ATX300 watt power supply is switch-selectable for 115 or 230 Vac at an operating frequency of 50/60 Hz. It is designed to comply with existing emission standards and provides sufficient power for a fully loaded system configuration. The power supply voltage selection switch is factory set to 115Vac for systems used in the United States; it is set to 230Vac for systems used in Europe.

Peripheral Bays

The system supports a variety of standard PC AT-compatible peripheral devices. The chassis includes these peripheral bays:

- A 3.5-inch front panel bay for mounting the standard 3.5" diskette drive (supports 720 KB and 1.44 MB diskette media)
- Four 5.25-inch removable media front panel bays for mounting half-height 5.25-inch peripheral devices: standard CD ROM drive and optional tape drives, etc.
- Seven hot-swap SCSI hard disk drive bays for mounting up to seven SCSI hard disk drives in easily removable drive carriers.

> ***Note:*** The SCSI hard disk drive bays contain a hot-swap back plane that require an 80-pin single connector attachment (SCA) connector on the drives that you install.

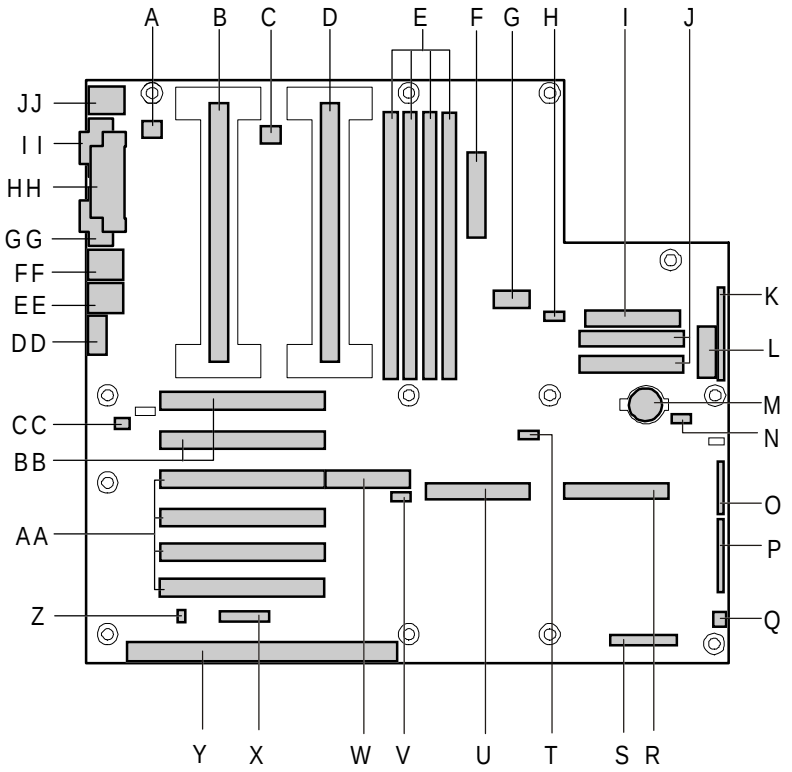
SAF-TE Board

The system has a SAF-TE (SCSI Accessed Fault Tolerant Enclosure) board that provides an interface for the disk subsystem to automatically integrate with peripheral packaging that supports status signals, hot swapping drives, and enclosure monitoring.

The transport mechanism for the standardized alert detection and status reporting is the SCSI bus. Disk drives, power supplies, cooling fans, and temperature are continually monitored and the conditions then reported over the SCSI bus to the system. When used with RAID management software the user can be alerted of impending or imminent disk conditions requiring attention. This allows the user to react to conditions that could normally go unnoticed until data loss.

System Board Features

The system board offers a “flat” design with the processor and memory subsystems residing on the board. This figure shows the major components on the system board. The following subsections describe the system board major components.



System Board

A.	Fansink connector 2	S.	Server monitor module (SMM) connector
B.	Secondary processor	T.	External Wake on LAN connector
C.	Fansink connector 1	U.	Ultra2/LVD SCSI connector
D.	Primary processor	V.	Hard drive LED connector
E.	DIMM slots	W.	Adaptec ARO-1130 connector/PCI slot 4
F.	Main power connector (CAUTION: The power plug can only be plugged into the first 20 pins of the 24-pin main power connector.)	X.	Reserved
G.	ATX Aux power connector	Y.	ISA connector
H.	Fan connector FAN2A	Z.	Chassis intrusion connector
I.	Diskette drive connector	AA.	PCI-33/32 connectors
J.	IDE connectors	BB.	PCI-66/32 connectors
K.	ATX front panel connector	CC.	Fan connector FAN2B
L.	Front panel connector, 16 pin	DD.	Video connector
M.	Lithium backup battery	EE.	USB connectors
N.	Reserved	FF.	NIC connector and LEDs
O.	Jumper block	GG.	Serial port connector
P.	Jumper block	HH.	Parallel port connector
Q.	Fan connector 1	II.	Serial port connector
R.	Ultra Wide SCSI connector	JJ.	Mouse/keyboard connectors

Processors

Depending on system configuration, each system may include one or two processors. Each processor is packaged in either a Single Edge Contact Cartridge (SECC) or Single Edge Contact Cartridge 2 (SECC2) package. The cartridge includes the processor core with an integrated 16 KB primary (L1) cache; the secondary (L2) cache; a thermal plate; and a back cover. The processor implements the MMX™ technology and the processor's numeric coprocessor significantly increases the speed of floating-point operations.

The processor external interface is MP (Multi-Processor) ready and operates at a maximum of 100 MHz. The processor contains a local APIC (Advanced Programmable Interrupt Controller) section for interrupt handling in MP and UP (Uni-Processor) environments.

The second-level cache is located on the substrate of the processor cartridge. The cache includes burst pipelined synchronous static RAM (BSRAM). The L2 cache is offered in 512 KB configurations only, with error correcting code (ECC) that operates at half the core clock rate.

System Memory

The system board contains four 168-pin DIMM sockets. Memory is partitioned as four banks of SDRAM DIMMs, each providing 72 bits of noninterleaved memory (64-bit main memory plus ECC). Your system may include from 32 MB to 1 GB of memory, using up to four DIMMs.

System memory begins at address 0 and is continuous (flat addressing) up to the maximum amount of DRAM installed (exception: system memory is noncontiguous in the ranges defined as memory holes using configuration registers). The system supports both base (conventional) and extended memory.

Note: Memory should be added in order from slot 1 to slot 4.

Note: Use DIMMS currently available from the Approved Vendors List (AVL) only. Contact your NEC sales representative or dealer for the current AVL of memory modules (DIMMs) available for your server.

I/O Expansion Slots

The server's expansion capabilities meet the needs of file and application servers for high performance I/O by providing a combination of PCI local bus and ISA connectors.

The system board has one full-length ISA bus connector.

The ISA features include:

- Bus speed up to 8.33 MHz
- 16-bit memory addressing
- Type A transfers at 5.33 Mbps
- Type B transfers at 8 Mbps
- 8- or 16-bit data transfers
- Plug and Play ready.

The system board has four full-length PCI (PCI-33/32 bit) connectors.

The PCI features include:

- Bus speed up to 33 MHz
- 32-bit memory addressing
- 5 V signaling environment
- Burst transfers of up to 133 Mbps
- 8-, 16-, or 32-bit data transfers
- Plug and Play ready
- Parity enabled.

The system board has two full-length PCI-66 universal connectors.

The PCI features include:

- Bus speed up to 66 MHz
- 32-bit memory addressing
- 5 V/3.3 V signaling environment
- Burst transfers of up to 266 Mbps
- 8-, 16-, or 32-bit data transfers
- Plug and Play ready
- Parity enabled.

Note: If a PCI-33 card is installed into one of the PCI-66 slots, the bus speed for both PCI-66 slots will be lowered to 33 MHz.

Real-Time Clock/Calendar

The Y2K compliant real-time clock provides system clock/calendar information stored in a non-volatile memory (NVRAM). The real-time clock battery provides power backup for the real-time clock.

BIOS

A BIOS and Setup Utility are located in the Flash EPROM on the system board and include support for system setup and PCI/ISA Plug-and-Play auto-configuration. A number of security, reliability, and management features also have been incorporated to meet vital server needs.

IDE Controller

IDE is a 16 bit interface for intelligent disk drives with disk controller electronics onboard. The PCI/ISA/IDE Accelerator, also known as PIIX4e, is a multifunction device on the server board that acts as a PCI based Fast IDE controller. The device controls:

- PIO and IDE DMA/bus master operations
- Mode 4 timings
- Transfer rates up to 33 MB/s
- Buffering for PCI/IDE burst transfers
- Master/slave IDE mode
- Up to two devices per channel; two channels, IDE0 and IDE1

The IDE controller provides support for the internally mounted CD-ROM and an optional tape device.

Network Controller

The system board includes a 10BASE-T/100BASE-TX network controller based on the Intel 82559 single chip Fast Ethernet PCI Bus Controller. As a PCI bus master, the controller can burst data at up to 132 MB/sec. The controller contains two receive and transmit FIFO buffers that prevent data overruns or underruns while waiting for access to the PCI bus. The controller has the following:

- 32-bit PCI bus master interface (direct drive of bus), compatible with *PCI Bus Specification, Revision 2.1*
- Chained memory structure with improved dynamic transmit chaining for enhanced performance
- Programmable transmit threshold for improved bus utilization
- Early receive interrupt for concurrent processing of receive data
- On-chip counters for network management

- Autodetect and autoswitching for 10 or 100 Mbps network speeds
- Support for both 10 Mbps and 100 Mbps networks, capable of full or half duplex, with back-to-back transmit at 100 Mbps.

The network status LEDs on the system board, which are visible from the rear of the chassis indicate:

- Transmit/receive activity on the LAN
- Valid link to the LAN
- 10/100 Mbps transfer mode.

SCSI Controller

The system board includes an embedded Adaptec AIC-7896 dual function SCSI controller. The Adaptec AIC-7896 contains one independent Ultra2 (LVD) wide and one Ultra wide SCSI interface that share a single PCI bus master controller.

No logic, termination, or resistor loads are required to connect devices to the SCSI controller other than termination in the device at the end of the cable. The SCSI bus is terminated on the server board with active terminators that cannot be disabled. The onboard device must always be at one end of the bus.

Video Controller

The system has a high-performance SVGA subsystem that supports the following:

- BIOS compatibility with VGA, EGA, CGA, Hercules Graphics, and MDA
- 2 MB of Video Random Access Memory (VRAM) video buffer
- 16-bit bus for high-speed display memory access
- Hardware accelerated bit block transfers (BITBLT)
- Display power management system
- Supports 72Hz refresh, non-interlaced at: 640x480, 800x600, 1024x768, or 1280x1024 resolutions
- Displays of up to 16M colors at 640x480 and 800x600 resolutions, 64K colors at 1024x768 resolutions and 256 colors at 1280x1024 resolutions.

Peripheral Controller

The advanced integrated peripheral controller supports two serial ports, one parallel port, diskette drive, PS/2-compatible keyboard and mouse, and integrated Real Time Clock (RTC). The system provides the connector interface for each port.

Serial Ports

Both serial ports are relocatable. Each serial port can be set to one of four different COM ports and can be enabled separately. When disabled, serial port interrupts are available to add-in boards.

Parallel Port

One IEEE 1284-compatible 25-pin bidirectional EPP (supporting levels 1.7 and 1.9) parallel port is provided. BIOS programming enables the parallel port and determines the port address and interrupt. When disabled, the interrupt is available to add-in boards.

Keyboard and Mouse

The keyboard/mouse controller is PS/2-compatible. The server may be locked automatically if there is no keyboard or mouse activity for a predefined length of time, if specified through the System Setup Utility (SSU). Once the inactivity (lockout) timer has expired, the keyboard and mouse do not respond until the previously stored password is entered.

ACPI

The server supports the Advanced Configuration and Power Interface (ACPI) as defined by the ACPI 1.0 and PC97 specifications. An ACPI aware operating system can put the system into a state where the hard drives spin down, the system fans stop, and all processing is halted. However, the power supply will still be on and the processors will still be dissipating some power, so the power supply fan and processor fans will still run.

⚠ CAUTION

The system power is off only when the AC power cords are disconnected from the back of the chassis.

External Device Connectors

The external I/O connectors provide support for a PS/2 compatible mouse and a keyboard, connectors for VGA monitor, 2 serial port connectors, a parallel port connector and two USB connections.

System Board Management Controller (BMC)

All server management functionality is concentrated in the System Board Management Controller (BMC). The BMC and associated circuitry are powered from a 5Vdc standby voltage, which remains active when system power is switched off, but the ac power source is still on and connected.

One major function of the BMC is to autonomously monitor system management events, and log their occurrence in the nonvolatile System Event Log (SEL). These include events such as overtemperature and overvoltage conditions, fan failure, or chassis intrusion. To enable accurate monitoring, the BMC maintains the nonvolatile Sensor Data Record (SDR), from which sensor information can be retrieved. The BMC provides an ISA host interface to SDR sensor information, so software running on the server can poll and retrieve the server's current status.

SEL contents can be retrieved after system failure, for analysis by field service personnel using server management software tools such as Intel Server Control available on the CD-ROM that ships with your system.

The BMC does the following:

- Monitors server board temperature and voltage
- Monitors processor presence and controls FRB
- Detects and indicates baseboard fan failure
- Manages the SEL interface
- Monitors the system management watchdog timer
- Monitors the periodic SMI timer
- Manages front panel NMI handling
- Monitors the event receiver
- Manages the ISA host and IMB interface
- Controls secure mode, including video blanking, floppy write-protect monitoring, and front panel lock/unlock initiation
- Manages the sensor event initialization agent

The BMC supports the Emergency Management Port (EMP) Console, which allows remote server management via a modem or direct connection to a manager system. Events monitored by the manager system include over-temperature and over-voltage conditions, fan failure, or chassis intrusion.

Emergency Management Port Console

The Emergency Management Port (EMP) Console provides an interface to the Emergency Management Port (EMP). This interface allows remote server management via a modem or direct (serial port to serial port) connection.

The server control operations available with EMP Console are:

- Connecting to remote servers
- Powering the server on or off
- Resetting the server

The EMP Console uses three management plug-ins to monitor the server:

- SEL Viewer
- SDR Viewer
- FRU Viewer

The EMP Console also has Phonebook plug-in that can be used to create and maintain a list of servers and their phone numbers.

> ***Note:*** EMP and PEP (Platform Event Paging) share your modem. PEP has priority over all applications except EMP. If an alert occurs, PEP will reset your modem and page you.

Information on the Emergency Management Port (EMP) Console may be found in Appendix C of this User's Guide.

Platform Event Paging

With Platform Event Paging (PEP), your server can be configured to automatically dial up a paging service and page you when a platform event occurs. Platform events include temperature out-of-range, voltage out-of-range, chassis intrusion, fan failure, etc.

If PEP is enabled and the BMC receives or detects a new event, it automatically sends a page. It can send a page if the processors are down or if the system software is unavailable.

PEP needs an external modem connected to the server's EMP (Emergency Management Port) serial connection. This is typically the COM2 serial connector.

System Security

To help prevent unauthorized entry or use of the system, the system includes a full lockable front panel and Server Management software that monitors the system intrusion switch.

Security with Mechanical Locks and Monitoring

The front panel of the tower-based system contains a mechanical lock to prevent access to the front of the computer chassis. In addition, each side cover contains a padlock loop (padlock not provided) located on the rear of the chassis to prevent removal of the side covers and access to the inside of the computer chassis

The computer chassis includes an intrusion switch for the front cover keylock and interlock switches for both the left side and the right-side covers (as viewed from the front). When the front cover is unlocked, the switch transmits an alarm signal to the system board, where BMC firmware and server management software process the signal. The side cover switches operate as interlock switches controlling power shut down to the system for safety reasons.

Software Locks

The BIOS Setup Utility and the System Setup Utility (SSU) provide a number of security features to prevent unauthorized or accidental access to the system. Once the security measures are enabled, access to the system is allowed only after the user enters the correct password(s). For example:

- Enable the keyboard lockout timer so that the server requires a password to reactivate the keyboard and mouse after a specified time-out period—1 to 120 minutes.
- Set and enable an administrative password.
- Set and enable a user password
- Set secure mode to prevent keyboard or mouse input and to prevent use of the front panel reset and power switches.
- Activate a hot-key combination to enter secure mode quickly.
- Disable writing to the diskette drive when secure mode is set.
- Disable access to the boot sector of the operating system hard disk drive.

Using Passwords

You can set either the user password, the administrator password, or both passwords.

> ***Note:*** Administrator can not disable or change the user password. If user password is set and administrator password is cleared, user can lockout administrator. If user password is set, administrator cannot lockout user.

If only the user password is set, you:

- Must enter the user password to enter BIOS Setup or the SSU.
- Must enter the user password to boot the server if Password on Boot is enabled in either the BIOS Setup or SSU.
- Must enter the user password to exit secure mode.

If only the administrator password is set, you:

- Must enter the administrator password to enter BIOS Setup or the SSU.
- Must enter the administrator password to boot the server if Password on Boot is enabled in either the BIOS Setup or SSU.
- Must enter the administrator password to exit secure mode.

If both passwords are set, you:

- May enter the user password to enter BIOS Setup or the SSU. However, you will not be able to change many of the options.
- Must enter the administrator password if you want to enter BIOS Setup or the SSU and have access to all of the options.
- May enter either password to boot the server if Password on Boot is enabled in either the BIOS Setup or SSU.
- May enter either password to exit secure mode.

Secure Mode

Configure and enable the secure boot mode by using the SSU. When secure mode is in effect:

- You can boot the server and the operating system will run, but you must enter the user password to use the keyboard or mouse.
- You cannot turn off system power or reset the server from the front panel switches.

Secure mode has no effect on functions enabled via the Server Manager Module (e.g. EMP) or power control via the real time clock.

Taking the server out of secure mode does not change the state of system power. That is, if you press and release the power switch while secure mode is in effect, the system will not be powered off when secure mode is later removed. However, if the front panel power switch remains depressed when secure mode is removed, the server will be powered off.

Summary of Software Security Features

Table 1-1 below lists the software security features and describes what protection each offers. In general, to enable or set the features listed here, you must run the SSU and go to the Security Subsystem Group, menu. The table also refers to other SSU menus and to the Setup utility.

Table 1-1. Software Security Features

Feature	Description
Secure mode	**How to enter secure mode:** • Setting and enabling passwords automatically places the system in secure mode. • If you set a hot-key combination (through the SSU or Setup), you can secure the system simply by pressing the key combination. This means you do not have to wait for the inactivity time-out period. When the system is in secure mode: The server can boot and run the operating system, but mouse and keyboard input is not accepted until the user password is entered. At boot time, if a CD is detected in the CD-ROM drive or a diskette in drive A, the system prompts for a password. When the password is entered, the server boots from CD or diskette and disables the secure mode. If there is no CD in the CD-ROM drive or diskette in drive A, the server boots from drive C and automatically goes into secure mode. All enabled secure mode features go into effect at boot time. To leave secure mode: Enter the correct password(s).
Disable writing to diskette	In secure mode, the server will not boot from or write to a diskette unless a password is entered. To set this feature, use the SSU Security Subsystem Group. To write protect access to diskette whether the server is in secure mode or not, use the Setup main menu, Floppy Options, and specify Floppy Access as read only.
Disable the power and reset buttons	Enable the feature through the SSU. Then the power and reset buttons are disabled when the server is in secure mode.
Set a time out period so that keyboard and mouse input are not accepted Also, screen can be blanked, and writes to diskette can be inhibited	Specify and enable an inactivity time out period of from 1 to 120 minutes. If no keyboard or mouse action occurs for the specified period, attempted keyboard and mouse input will not be accepted. The monitor display will go blank, and the diskette drive will be write protected (if these security features are enabled through Setup or the SSU). To resume activity: Enter the correct password(s).
Control access to using the SSU: set administrative password	To control access to setting or changing the system configuration, set an administrative password and enable it through Setup or the SSU. If both the administrative and user passwords are enabled, either can be used to boot the server or enable the keyboard and/or mouse, but only the administrative password will allow Setup and the SSU to be changed. To disable a password, change it to a blank entry or press CTRL-D in the Change Password menu of the Administrative Password Option menu found in the Security Subsystem Group. To clear the password if you cannot access Setup or the SSU, change the Clear Password jumper (see Chapter 3).

Table 1-1. Software Security Features (continued)

Feature	Description
Control access to the system other than SSU: set user password	To control access to using the system, set a user password and enable it through Setup or the SSU. To disable a password, change it to a blank entry or press CTRL-D in the Change Password menu of the User Password Option menu found in the Security Subsystem Group. To clear the password if you cannot access Setup or the SSU, change the Clear Password jumper (see Chapter 3).
Boot without keyboard	The system can boot with or without a keyboard. During POST, before the system completes the boot sequence, the BIOS automatically detects and tests the keyboard if it is present and displays a message. There is no entry in the SSU to enable or disable a keyboard.
Specify the boot sequence	The sequence that you specify on the menu in the SSU MultiBoot Group will determine the boot order. If secure mode is enabled (a user password is set), then you will be prompted for a password before the server fully boots. If secure mode is enabled and the “Secure Boot Mode” option is also enabled, the server will fully boot but will require a password before accepting any keyboard or mouse input.

2

Setting Up the System

- Overview
- Selecting a Site
- Unpacking the System
- Getting Familiar with the System
- Making Connections
- Setting the Line Voltage
- Connecting the Power Cord(s)
- Powering On Your System

Overview

This chapter describes how to select a site, unpack the system, make cable connections, and power on the tower-based system unit.

Selecting a Site

The system operates reliably in a typical office environment. Choose a site that is:

- Near grounded, three-pronged power outlets.

Note: For the United States and Canada, this means a NEMA 5-15R outlets for 100-120 VAC or NEMA 6-15R outlets for 200-240 VAC. For other international sites, this means three-pronged power outlets applicable for the electrical code of the region.

⚠ WARNING

Be sure the power service connection is through a properly grounded outlet.

⚠ CAUTION

When two power supplies are installed in the system the power plug from each of the power supplies must be plugged into the same common ground power outlets.

- Clean, dust-free, and well ventilated. Front and rear ventilating openings kept free of obstructions. Away from sources of heat, vibration or physical shock.
- Isolated from strong electromagnetic fields and electrical noise produced by electrical devices (such as air conditioners, large fans, large electric motors, radio and TV transmitters, and high-frequency security devices)
- Spacious enough to provide at least five inches (13 centimeters) behind the system and three inches (eight centimeters) on each side of the system for proper cooling, airflow, and cable clearance.
- Easily accessible for system maintenance and installation of system upgrades.

Unpacking the System

⚠ WARNING

Your system weighs approximately 65 pounds (29.25 kg). If your system contains numerous optional boards and peripheral devices, it will weigh more. To avoid personal injury, make sure you have someone help you lift or move the system.

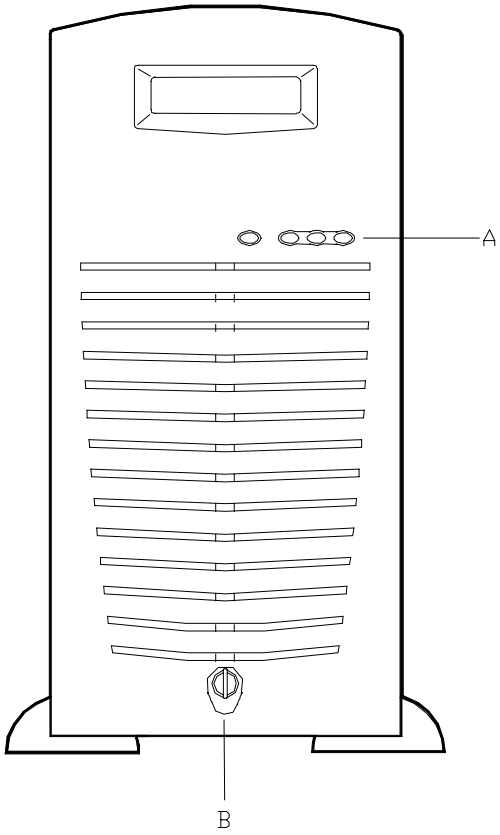
When you receive your system, inspect the shipping containers prior to unpacking. If the shipping boxes are damaged, note the damage, and if possible, photograph it for reference. After removing the contents of the containers, keep the cartons and the packing materials. If the contents appear damaged when you unpack the boxes, file a damage claim with the carrier immediately.

Getting Familiar with the System

Before setting up your system, you should become familiar with the system's features, such as the location of your system's front and rear panel switches, indicators and connectors, etc.

Front View with Front Door Closed

This figure shows the location of the front system features.



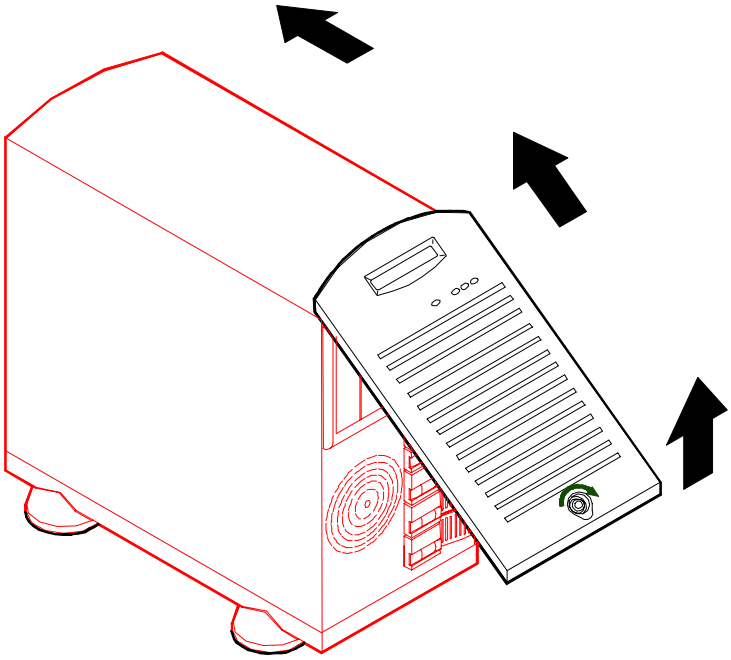
Front Features

A.	System indicators	(See "Front View with Front Door Opened" later in this chapter).
B.	Keylock	When locked, secures the front door not allowing access to the front system controls.

Front View with Front Door Opened

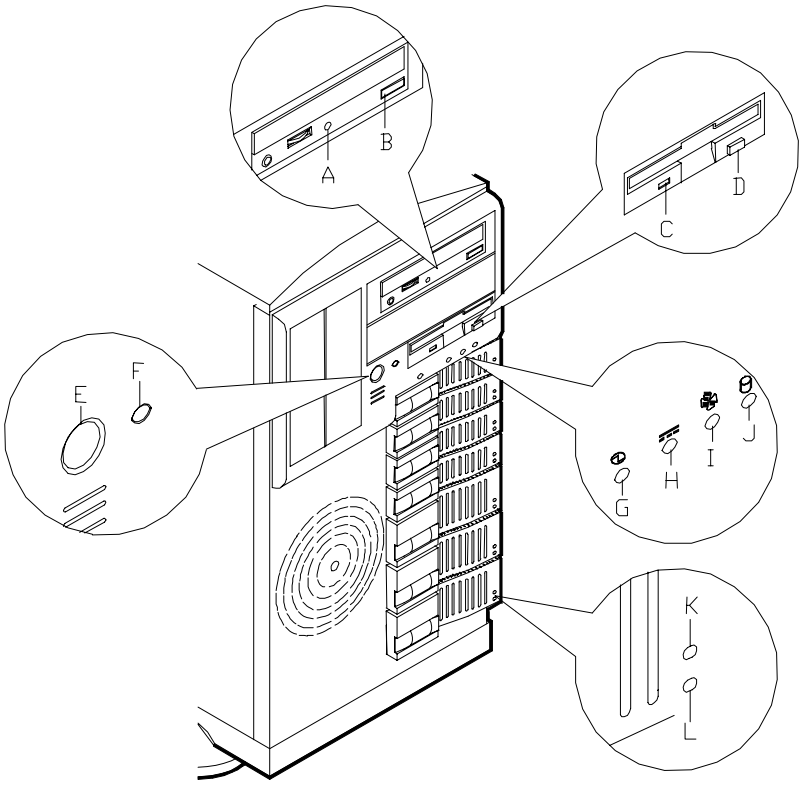
Refer to the following figure and open the front door of the cabinet as follows:

1. If door is locked, unlock the front door.
2. Pull the bottom of the front door out and tilt up until it is aligned level with the top of the cabinet, then push the door back directly over the top of the cabinet as far as it will go.



Opening the Front Door

This figure shows the location of the front system controls and indicators.

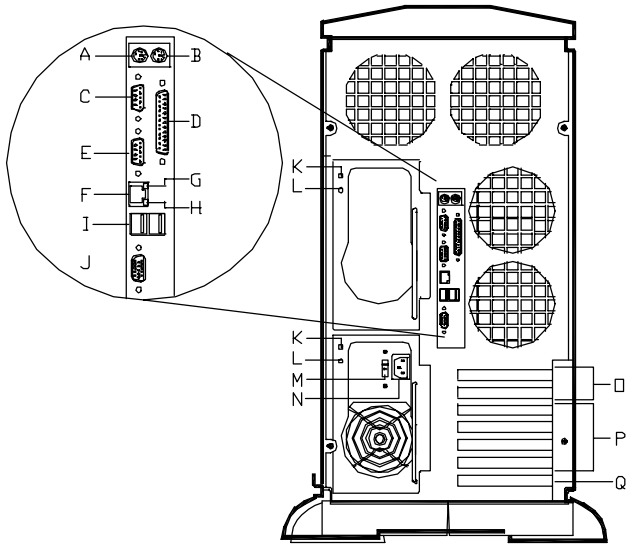


Front System Features and Controls

A.	Activity light, CD-ROM reader	When lit, CD-ROM reader is in use.
B.	Load/eject button, CD-ROM reader	Press to load CD and eject CD.
C.	Activity light, 3 ½-inch diskette drive	When lit, diskette is in use.
D.	Eject button, 3 ½-inch diskette drive	Press to eject diskette.
E.	DC power ON/OFF switch	Press to turn system DC power on or off.
F.	Reset switch	Press to reinitialize system.
G.	DC power ON/OFF	See table "Front System Status Indicator LEDs" that follow.
H.	Power alarm	See table "Front System Status Indicator LEDs" that follow.
I.	Fan alarm	See table "Front System Status Indicator LEDs" that follow.
J.	Array alarm	See table "Front System Status Indicator LEDs" that follow.
K.	Disk drive activity LED	See table "Disk Drive Status Indicator LEDs" that follow.
L.	Disk drive status LED	See table "Disk Drive Status Indicator LEDs" that follow.

Rear View

This figure shows the location of the following rear system features and controls.



Rear Features and Controls

A.	Keyboard	PS/2-compatible 6-pin mini-DIN connector.
B.	Mouse	PS/2-compatible 6-pin mini-DIN connector.
C.	COM1	COM1 serial port 9-pin connector.
D.	Printer	25-pin parallel port connector.
E.	COM2	COM2 serial port 9-pin connector.
F.	LAN connector	RJ-45 connector.
G.	Green LAN status light	See Table "LAN Status Indicator LEDs (I/O Panel)" that follows.
H.	Orange LAN status light	See Table "LAN Status Indicator LEDs (I/O Panel)" that follows.
I.	USB connectors	Two USB connectors
J.	VGA	VGA monitor 15-pin connector.
K.	Power supply status (green light)	See Table "Power Supply Status Indicator LEDs (Rear Panel)" that follows.
L.	DC power status (amber light)	See Table "Power Supply Status Indicator LEDs (Rear Panel)" that follows.
M.	Line voltage selector switch	Selects AC input power of 115 VAC or 230 VAC.
N.	AC input power connector	Supplies AC power to the power supply.
O.	PCI slots	Two PCI-66/32 add-in board slot locations.
P.	PCI slots	Four PCI-33/32 add-in board slot locations.
Q.	ISA slot	One ISA add-in board slot locations.

Status Indicator LED Descriptions

The following tables list the System Status Indicator LEDs, the Disk Drive Status Indicator LEDs, the Disk Drive Status Abnormal Conditions, the Power Supply Status Indicator LEDs, and the LAN Status Indicator LEDs along with a description of each LED indicator.

> ***Note:*** The Power Alarm, Fan Alarm, and the Array Alarm Status Indicator LEDs are active only when a RAID board is installed or server management software is in use.

Front System Status Indicator LEDs

LED	Status	Description	Response
DC Power ON/OFF	Off	DC power OFF	None required (normal)
	ON (Green)	DC power ON	None required (normal)
Power Alarm	Off	Not active	None required (normal)
	ON (Amber)	Failure has occurred in one or more power supplies (see the "Power Supply Status Indicators" table DC Power Status "Amber" that follows.)	
Fan Alarm	Off	All fans operating normally	None required (normal)
	ON (Amber)	Fan failure	Replace fan in chassis or replace power supply
Array Alarm	Off	Always OFF unless RAID is installed	None required (normal)
	ON (Amber)	RAID Array failure	Replace disk drive with amber light lite

Power Supply Status Indicator LEDs (Rear Panel)

LED	Status	Description	Response
Power Supply Status	Off	AC Power not available	None required (normal)
	ON (Green)	AC Power supplied to power supply	None required (normal)
DC Power Status	Off	No alarms	None required (normal)
	(Amber)	AC Power disconnected, power supply failed, or power supply not installed.	Verify AC power is ON, reconnect AC power, or replace power supply,

Disk Drive Status Indicator LEDs

LED	Status	Description	Response
Disk Drive Activity	Off	Not accessing disk drive	None required (normal)
	ON (Green)	Accessing disk drive	None required (normal)
Disk Drive Status	Off	No alarms	None required (normal)
	ON (Amber)	(See the "Disk Drive Status Conditions" table that follows.) Note: The Disk Drive Status Indicator LEDs are active only when a RAID board is installed.	

Disk Drive Status Conditions

Condition	LED
No Error	Off
Faulty or Rebuild Stopped	Steady ON
Rebuild	Slow Blink for approximately one second
Identify	Fast Blink for approximately three seconds
Predicted Fault	Four fast blinks, pause (repeats)
Hot Spare	Two fast blinks, pause (repeats)

LAN Status Indicator LEDs (I/O Panel)

LED	Status	When On	When Blinking	When Off
LAN Link Status	Green	N/A	Linked to network, sending or receiving data	N/A
LAN Speed Status	Orange	100 Mbps network connection	None	10 Mbps network connection

Making Connections

If your system normally operates without a video display or keyboard (for example, as a network server), you must install a video display and keyboard to configure the system. You may remove them after running the System Setup Utility (SSU). For information on running the SSU, refer to Appendix B of this User's Guide.

Refer to the previous figure (Rear Features and Controls) and connect your keyboard, monitor, and mouse. Connect any external peripheral devices such as a printer or modem by following the instructions included with these devices.

⚠ CAUTION

Damage to the system may result if the keyboard/mouse cable is inserted or removed when power is applied to the system.

Inserting a telephone line connector into a LAN board RJ-45 port may result in personal injury and equipment damage.

Setting the Line Voltage

The system contains an ATX300 watt power supply that is switch-selectable for 115 or 230 VAC at an operating frequency of 50/60Hz. The power supply voltage selection switch is factory set to 115Vac for systems shipped to North America; it is set to 230Vac for systems shipped in Europe. Line source voltages between 200 and 240 VAC are acceptable when the power supply input voltage is set to 230 VAC.

⚠ CAUTION

Before you plug the system power cord into an AC outlet, ensure the input line voltage setting for the power supply is correct.

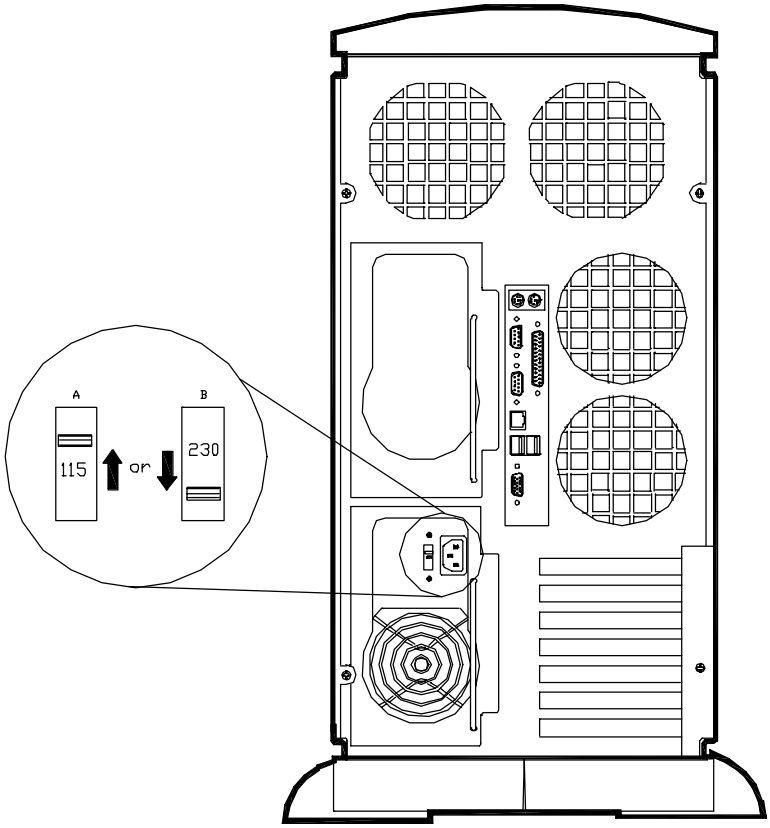
To use the system with line source voltages between 200 and 240 VAC, the line voltage selector switch on the power supply must be set to 230. If you set the switch to the 115 VAC position, the power supply will be damaged when you plug in your system.

When two power supplies are installed in the system both power supplies must have their line voltage selector switch set to the same voltage.

If you need to change the line voltage setting, perform the following steps.

Note: If you are setting up your system for the first time, the power cord will not be connected to the rear panel of your system.

1. Unplug the AC power cord from the back of the chassis.
2. Insert the tip of a small screwdriver or ballpoint pen into the depression on the line voltage selector.
3. Slide the selector switch to the left for 115 VAC or to the right for 230 VAC (line source voltage range: 220 to 240 VAC).



Setting the Line Voltage

A. Voltage selector switch set to 115 VAC

B. Voltage selector switch set to 230 VAC

Connecting the Power Cord(s)

Plug the female end of the AC power cord into the input receptacle on the rear of the power supply cage. Plug the male end of the power cord into NEMA 5-15R outlet for 100-120 VAC or NEMA 6-15R outlet for 200-240 VAC.

If the power cord(s) supplied with the system are not compatible with the AC wall outlet in your region, obtain a suitable power cord that meets the following criteria.

- The power cord must be rated for the available AC voltage and have a current rating that is at least 125% of the current rating of the system.
- The power cord connector that plugs into the wall outlet must be terminated in a grounding-type male plug designed for use in your region. It must have certification marks showing certification by an agency acceptable in your region.
- The power cord connector that plugs into the system must be an IEC-type CEE-22 female connector.
- The power cord must be less than 1.8 meters (6.0 feet) long.

⚠ WARNING

Your system shipped with a power cord for each power supply. Do not attempt to modify or use the supplied AC power cord if it is not the exact type required.

⚠ CAUTION

When two power supplies are installed in the system the power plug from each of the power supplies must be plugged into the same common ground power outlets.

Powering On Your System

Power on your system as follows.

1. Make sure all external devices, such as a video display, keyboard, and mouse (optional) have been connected, and the power cords are connected.
2. Power on the video display and any other external devices.
3. Press the push-button power on/off switch on the front panel. Verify that the system power-on LED is lit. If it is not lit, ensure the ac power cords are connected to a functional ac power source.

After a few seconds your system begins the internal Power-On Self Tests (POST). POST automatically checks the system board, CPU module, memory, keyboard, and most installed peripheral devices.

⚠ CAUTION

Always allow POST to complete before powering down your system.

⚠ CAUTION

The server management logic on your system board monitors and logs system voltage changes. When powering down your system you may experience a 1–5 second delay from the time you press the push-button power on/off switch on the front panel and your system powering down. This is normal system operation and is required by the server management logic.

If you have problems powering on your system, refer to *Problem Solving* in Chapter 5 of this User's Guide.

After you have successfully powered on your system, refer to "Configuring Your System" in Chapter 3 of this User's Guide.

3

Configuring Your System

- Configuring Your System
- Hot Keys
- BIOS Setup Utility
- Adaptec SCSI Utility
- Installing Video Drivers
- Configuring System Board Jumpers

Configuring Your System

Configuration and setup utilities are used to change your system configuration. You can configure your system, as well as option boards you may add to your system, using the BIOS Setup Utility. Several unique system parameters are configured using the BIOS Setup, which is stored in the system FLASH memory.

You can also configure your system, including reserving resources required by the option boards, using the System Setup Utility (SSU). Also, the SSU is used to read stored system event information. Information on the SSU may be found in Appendix B of this User's Guide.

The Adaptec Configuration Utility detects the SCSI host adapters on the system board. Use this utility if you need to configure the two SCSI controllers in your system or to perform a SCSI disk format or verify disk operation on the SCSI disk drives.

If your system has been factory configured, the SSU, BIOS Setup, or Adaptec Configuration Utility do not need to be run unless you want to change the password or security features, add certain types of option boards or devices, or upgrade your system board.

This chapter also provides information on several system configuration parameters that are set by jumpers on the system board. However, these parameters do not usually require change.

Use the CD-ROM shipped with your system to create the device driver and SSU diskettes.

Hot Keys

For Hot keys use the keyboard's numeric pad to enter numbers and symbols. See Hot Keys table below.

Hot Keys

To do this:	Press these keys
Clear memory and reload the operating system—this is a system reset.	Ctrl+Alt+Del
Secure your system immediately.	Ctrl+Alt+hotkey (Set your hot key combination with the SSU or Setup.)

BIOS Setup Utility

The BIOS Setup Utility is used to change system configuration parameters. This utility has some unique parameters and many parameters that are also configurable with the SSU. The utility is resident in the system FLASH memory and does not require a diskette or an operating system present to run. However, parameters set with the BIOS Setup Utility that can also be set with the SSU, will be overwritten by the SSU the next time the SSU is run.

Using the BIOS Setup Utility

You access the BIOS Setup utility when you turn on or reboot your system. To run the BIOS Setup Utility, perform the following procedure:

1. Power-on or reboot the system. "Press F2 to enter SETUP" displays.
2. Press **F2**. The BIOS Setup Utility starts and the Main Menu is displayed. The menu bar at the top of the Main Menu lists the following selections:

Menu	Use
Main	Use this menu for basic system configuration.
Advanced	Use this menu for setting the Advanced Features available on your system.
Security	Use this menu to set User and Supervisor Passwords and the Backup and Virus-Check reminders.
Server	Use this menu for configuring Server Management features.
Boot	Use this menu to configure Boot Device priority.
Exit	Exits the current menu.

Use the arrow keys to select a menu or an item on a displayed menu. Press the value keys (listed in the table below) to cycle through the allowable values for the selected field. Use the Exit menu's "Save Values" selection to save the current values on all the menus.

To display a submenu, position the cursor on a selection that has a submenu and press **ENTER**. An arrow precedes selections with submenus.

Refer to the following table for information on the keys that you use with BIOS Setup. These keys are also listed at the bottom of the Setup menu.

Key	Function in Setup Menu
F1 or Alt-H	Get Help about an item.
ESC	Exit the current menu and return to the previous menu.
Left or right arrow keys	Move between menus.
Up or down arrow keys	Move cursor up and down. The cursor moves only to the settings that you can change.
+/-	Change the value of an item.
HOME or END	Move cursor to top or bottom of window.
PAGE UP or PAGE DOWN	Move cursor to next or previous page.
F9	Load default configuration values for this menu.
F10	Save configuration values and exit.
ENTER	Execute command or Select ➨ submenu.

BIOS Setup Configuration Settings

The BIOS Setup Configurations tables show the default settings for the BIOS Setup Utility and provides a place for you to record any changes you make to these settings. Recommended values are **bold** in the following tables.

Main Menu

Feature	Choices	Description	Your Setting
System Time	HH:MM:SS	Sets the system time.	
System Date	MM/DD/YYYY	Sets the system date.	
Legacy Diskette A:	Disabled 360KB 1.2 MB 720KB **1.44/1.25 MB** 2.88 MB	Selects the diskette type.	
Legacy Diskette B:	**Disabled** 360KB 1.2 MB 720KB 1.44/1.25 MB 2.88 MB	Selects the diskette type.	
Primary IDE Master	Press **ENTER**	Refer to "Primary IDE Master and Slave Submenu."	
Primary IDE Slave	Press **ENTER**	Refer to "Primary IDE Master and Slave Submenu."	
Secondary IDE Master	Press **ENTER**	Refer to "Secondary IDE Master and Slave Submenu."	
Secondary IDE Slave	Press **ENTER**	Refer to "Secondary IDE Master and Slave Submenu."	
Keyboard Features	Press **ENTER**	Refer to "Keyboard Submenu."	
Memory Cache	**Enabled** Disabled	Enables processor cache.	
CPU Speed Setting	Processor Speed List	Select speed to match speed of installed processor(s) or select the lowest speed. **Caution: DO NOT** select a speed above the speed of the installed processor(s).	
CPU Post Speed Setting	Processor Post Speed List	Processor Post speed list is determined by the speed of the processor(s) installed.	
Processor Retest	**No** Yes	Select Yes, if you want BIOS to clear historical processor status and retest all processors on next boot.	
Processor Serial Number	**Disabled** Enabled	Controls detection of the processor serial number.	
Language	**English (US)** Spanish, Italian French, German, Japanese	Selects which language BIOS displays.	

Primary/Secondary IDE Master and Slave Submenu

Feature	Choices	Description	Your Setting
Type	**Auto** None CD-ROM User ATAPI Removable IDE Removable	Auto allows the system to attempt auto-detection of the drive type and sets the system to optimum transfer mode. None informs the system to ignore this drive. CD ROM allows the manual entry of fields described below. User allows the manual entry of all fields described below. ATAPI Removable informs the system that removable disk drive is installed here. IDE Removable informs the system that removable disk drive is installed here.	
Multi-Sector Transfer	Disabled 2, 4, 8, or 16 sectors	Determines the number of sectors per block for multi-sector transfers. This field is informational only for Type Auto.	
LBA Mode Control	Disabled **Enabled**	Enabling LBA causes logical block addressing to be used in place of cylinders, heads, and sectors. This field is informational only for Type Auto.	
32 Bit I/O	Disabled **Enabled**	Enabling allows 32 bit IDE data transfers. This field is informational only for Type Auto.	
Transfer Mode	Standard Fast PIO 1 Fast PIO 2 Fast PIO 3 Fast PIO 4 FPIO 4/DMA 2 FPIO 3/DMA 1	Selects the method for moving data to and from the drive. This field is informational only for Type Auto.	
Ultra DMA Mode	Disabled Mode 0 Mode 1 Mode 2	Selects the Ultra DMA Mode for moving data to and from the drive. This field is informational only for Type Auto.	

Keyboard Submenu

Feature	Choices		Description	Your Setting
NumLock	**On** Off		Selects power-on state for Num Lock.	
Key Click	**Disabled** Enabled		Enables or disables key click.	
Keyboard auto-repeat rate	13.3/sec 10/sec 6/sec 2/sec	**30/sec** 26.7/sec 21.8/sec 18.5/sec	Selects key repeat rate.	
Keyboard auto-repeat delay	1/4 sec **1/2 sec** 3/4 sec 1 sec		Selects delay before key repeat.	

Advanced Menu

Feature	Choices	Description	Your Setting
Installed O/S:	**Other** Plug-n-Play	Select Other unless installing Windows 9X.	
Reset Configuration Data	**No** Yes	Select Yes if you want to clear the system configuration data during next boot. System automatically resets to No in next boot.	
PCI Configuration	Press **ENTER**	Refer to "PCI Configuration Submenu."	
Integrated Peripherals Configuration	Press **ENTER**	Refer to "Integrated Peripherals Configuration Submenu."	
Advanced Chipset Control	Press **ENTER**	Refer to Advanced Chipset Control Submenu."	
Use Multiprocessor Specification	1.1 **1.4**	Selects the version of multiprocessor specification to use. Some operating systems require version 1.1.	
Large Disk Access Mode	**LBA** CHS	Select LBA for IDE drives.	
Delay on Option ROMs	**Disabled** Enabled	Forces a short delay at the end of each Option ROM scan.	

PCI Configuration Submenus

Qualified technical personnel should only change this submenu.

⚠ CAUTION

Leave PCI Configuration Submenu at factory-default settings. A technically qualified person should only change this submenu.

PCI Configuration Submenu

Feature	Choices	Description	Your Setting
PCI Device, Embedded SCSI Devices	Press **ENTER.**	N/A	
Option ROM Scan	**Enabled** Disabled	Enables option ROM scan of the selected device.	
Enable Master	**Enabled** Disabled	Enabled selects the device as a PCI bus master.	
Latency Timer	Default 0020h **0040h** 0060h 0080h 00A0h 00C0h 00E0h	Minimum guaranteed time, in units of PCI bus clocks, that a device may be master on a PCI bus.	

PCI Device, Slot 1 - Slot 7 Submenus

Qualified technical personnel should only change this submenu.

⚠ CAUTION

Leave PCI Device Submenu at factory-default settings. A technically qualified person should only change this submenu.

PCI Device Submenu

Feature	Choices	Description	Your Setting
Enable Master	**Enabled** Disabled	Enables selected device as a PCI bus master.	
Latency Timer	Default 020h **040h** 060h 080h 0A0h 0C0h 0E0h	Minimum guaranteed time, in units of PCI bus clocks, that a device may be master on a PCI bus.	

Integrated Peripheral Configuration Submenu

Feature	Choices	Description	Your Setting
COM 1: (Serial Port A)	Disabled **Enabled** Auto OS Controlled	Auto forces BIOS to configure the port. OS Controlled forces OS to configure the port.	
Base I/O Address	**3F8** 2F8 3E8 2E8	Selects the base I/O address for COM port 1.	
Interrupt	**IRQ 4** IRQ 3	Selects the IRQ for COM port 1.	
COM 2: (Serial Port B)	Disabled **Enabled** Auto OS Controlled	Auto forces BIOS to configure the port. OS Controlled forces OS to configure the port.	
Base I/O Address	3F8 **2F8** 3E8 2E8	Selects the base I/O address for COM port 2.	
Interrupt	IRQ 4 **IRQ 3**	Selects the IRQ for COM port 2	
Parallel Port	Disabled **Enabled** Auto OS Controlled	Auto forces BIOS to configure the port. OS Controlled forces OS to configure the port.	
Mode	Output only **Bi-directional** EPP ECP	Selects parallel port mode.	
Base I/O Address	**378** 278 3BC	Selects the base I/O address for LPT port.	
Interrupt	IRQ 5 **IRQ 7**	Selects the IRQ for LPT port.	
DMA channel	**DMA 1** DMA 3	Selects the DMA for LPT port.	
Floppy disk controller	Disabled **Enabled**	Enables onboard diskette controller.	

Advanced Chipset Control

Feature	Choices	Description	Your Setting
640 – 768K	Disabled **Enabled**	If enabled, ISA Master and DMA cycles are forwarded to PCI.	
Delayed Transaction	**Disabled** Enabled	Enable the delayed transaction mechanism when PIIX4 is target of a PCI transaction.	
Passive Release	**Disabled** Enabled	Enable the Passive Release mechanism on PHOLD# signal when PIIX4 is a PCI MASTER.	

Security Menu

> ***Note:*** Enabling the Supervisor Password field requires a password for entering Setup. The passwords are not case sensitive.

Feature	Choices	Description	Your Setting
User Password is	**Clear** Set	Status only; user cannot modify. Once set, this can be disabled by setting it to a null string, or by clearing password jumper on system board (see System Board Jumpers in Chapter 3).	
Supervisor Password is	**Clear** Set	Status only; user cannot modify.	
Set User Password	Press **ENTER**	When the <Enter> key is pressed, the user is prompted for a password; press ESC key to abort. Once set, this can be disabled by setting it to a null string, or by clearing password jumper on system board (refer to System Board Jumpers in this chapter).	
Set Supervisor Password	Press **ENTER**	When the <Enter> key is pressed, the user is prompted for a password; press ESC key to abort. Once set, this can be disabled by setting it to a null string, or by clearing password jumper on system board (refer to System Board Jumpers in this chapter).	
Password on Boot	**Disabled** Enabled	Requires password entry before boot. System will remain in secure mode until password is entered. Password on Boot takes precedence over Secure Mode Boot.	
Fixed Disk Boot Sector	**Normal** Write Protect	Write-protects boot sector on hard disk to protect against viruses.	
Secure Mode Timer	1 min 2 min 5 min 10 min 20 min 1 hr 2 hr	Period of key/PS/2 mouse inactivity specified for secure mode to activate. A password is required for secure mode to function. Cannot be enabled unless at least one password is enabled.	

Security menu (Continued)

Feature	Choices	Description	Your Setting
Secure Mode Hot Key (Ctrl-Alt-)	[ ] [A, B, ..., Z]	Key assigned to invoke the Quicklock feature. Cannot be enabled unless at least one password is enabled.	
Secure Mode Boot	**Disabled** Enabled	System will boot in secure mode. The user must enter a password to unlock the system. Cannot be enabled unless at least one password is enabled.	
Video Blanking	**Disabled** Enabled	Blank video when secure mode is activated. The user must enter a password to unlock the system. Cannot be enabled unless at least one password is enabled.	
Floppy Write Protect	**Disabled** Enabled	When secure mode is activated, the diskette drive is write protected. The user must enter a password to disable. Cannot be enabled unless at least one password is enabled.	
Front Panel Lockout	**Disabled** Enabled	Disables front panel when secure mode activates. Requires password to unlock system.	

Server Menu

Feature	Choices	Description	Your Setting
System Management	Press **ENTER**	Refer to “System Management Submenu.”	
Console Redirection	Press **ENTER**	Refer to “Console Redirection Submenu.”	
PEP Management	Press **ENTER**	Refer to "PEP Management Submenu."	
Enable Sleep Button	**No** Yes	No sleep button enabled.	
PCI IRQs to IO-APIC mapping	**Disabled** Enabled	If enabled, BIOS will describe direct PCI interrupt connections to IO APIC in multiprocessor table. Do not enable if OS does not support this feature.	
Processor Retest	**No** Yes	Select Yes to have BIOS clear all historical processor status and retest the processor(s) on bootup.	
Assert NMI or PERR	**SMI ONLY** Disabled SMI & NMI	Enabled, NMI is generated. The SERR option needs to be enabled to activate this option.	
Assert NMI & SERR	**Enabled** Disabled	If enabled, NMI is generated on SERR and LOGGED.	

System Management Submenu

Feature	Choices	Description	Your Setting
Sever Management Info	Press **ENTER**	Refer to "System Management Info Submenu."	
System Event Logging	Disabled **Enabled**	When enabled, BIOS and BMC will log system events.	
Clear Event Log	**No** Yes	Yes clears the System Event Log.	
EMP Password Switch	**Disabled** Enabled		
EMP ESC Sequence	Refer to Appendix B.		
EMP Hangup Line String	Refer to your modem documentation.		
Modem Init String	Refer to your modem documentation.		
High Modem Init String	Refer to your modem documentation.		
EMP Access Mode	**Disabled** Always Active Pre-boot only		
EMP Restricted Mode Access	**Disabled** Enabled		
EMP Direct Connect/Modem Mode	**Direct Connect** Modem Mode		

Server Management Information Submenu

The user can modify no items on this menu. If items require changes, consult your system administrator.

Feature	Choices	Description	Your Setting
Board Part Number	N/A	Information field only	
Board Serial Number	N/A	Information field only	
System Part Number	N/A	Information field only	
System Serial Number	N/A	Information field only	
Chassis Part Number	N/A	Information field only	
Chassis Serial Number	N/A	Information field only	
BMC Revision	N/A	Information field only	
Primary HSBP Revision	N/A	Information field only	

Console Redirection Submenu

Feature	Choices	Description	Your Setting
COM Port Address	**Disabled** 3F8 2F8 3E8	When enabled, console redirection uses the I/O port specified.	
IRQ #	**None** 3 4	When console redirection is enabled, this displays the IRQ assigned per the address chosen in the COM Port Address field.	
Baud Rate	9600 19.2k 38.4k 115.2k	Communications line dependent.	
Flow Control	No Flow Control CTS/RTS XON/XOFF CTS/RTS + CD	Communications line dependent.	

PEP Management Submenu

Feature	Choices	Description	Your Setting
PEF Filter Events	Press **ENTER**	Refer to "PEF Filter Events Submenu."	
PEP Enable	Enabled **Disabled**	Enables or disables Platform Event Paging.	
PEP Blackout Period	**[0]**	Sets the minimum time between consecutive pages in minutes.	
Send Test Page	Press **ENTER**	Press ENTER and select "Send Test Page Now" to send a page immediately using the current page string.	

PEF Filter Events Submenu

Feature	Choices	Description	Your Setting
PEF Enable	**Disabled** Enabled	Enable or disable all triggers for Platform Event Paging. If this is enabled, and one of the events you enable below occurs, the server will page you.	
Temperature Sensor	**Disabled** Enabled		
Voltage Sensor	**Disabled** Enabled		
Fan Sensor	**Disabled** Enabled		
Chassis Sensor	**Disabled** Enabled		
Power Supply	**Disabled** Enabled		
BIOS (SMI Handler)	**Disabled** Enabled		
BIOS POST Error	**Disabled** Enabled		
FRB Sensor	**Disabled** Enabled		
Fatal NMI	**Disabled** Enabled		
Watchdog Timer	**Disabled** Enabled		
System Restart	**Disabled** Enabled		

Boot Menu

Feature	Choices	Description	Your Setting
BIOS Boot Spec Support	**Enabled** Limited	Enable this option if the boot order is important.	
Boot Device Priority	Press **ENTER**.	Refer to “Boot Device Priority Submenu.”	
Hard Drive	Press **ENTER**.	Refer to “hard Drive Submenu.”	
Removable Devices	Press **ENTER**.	Refer to “Removable Devices Submenu.”	

Boot Device Priority Submenu

Use the up or down arrow keys to select a device, then press the <+> or <-> keys to move the device higher or lower in the boot priority list.

Boot Device Priority Submenu

Boot Priority	Device	Description	Your Setting
1.	ATAPI CD-ROM Drive	Attempts to boot from an ATAPI CD-ROM drive.	
2.	Removable Devices	Attempts to boot from a removable media device.	
3.	Hard Drive	Attempts to boot from a hard drive device.	
4.	LANDesk® Service Agent II	Attempts to boot from diagnostic boot partition of the flash memory.	

Hard Drive Submenu

For options on this menu, use the up or down arrow keys to select a device, then press the <+> or <-> keys to move the device higher or lower in the boot priority list.

Hard Drive Submenu

Option	Description
1. Hard Drive #1 (or actual drive string)	IDE drives will have a suffix attached to the drive ID string: PM - hard drive on Primary Master Channel PS - hard drive on Primary Slave Channel SM - hard drive on Secondary Master Channel SS - hard drive on Secondary Slave Channel.
2. Other Bootable Device	Covers all the boot devices that are not reported to the system BIOS through the BIOS boot specification mechanism. This includes all PCI cards that are not BIOS boot compliant (legacy) as well as ISA cards that are not PnP compliant.. ISA legacy cards will boot first before non BIOS boot compliant PCI cards (in scan order from lowest slot to highest).

Removable Devices

For options on this menu, use the up or down arrow keys to select a device, then press the <+> or <-> keys to move the device higher or lower in the boot priority list.

Removable Devices Submenu

Option	Description
1. Legacy Floppy Drive	Refers to the onboard 3.5” floppy drive.

Exit Menu

You can make the following selections on the Exit Menu. Select an option using the up or down arrow keys, then press Enter to execute the option. Pressing Esc does not exit this menu. You must select one of the items from the menu or menu bar to exit.

Exit Menu

Choices	Description
Exit Saving Changes	Exits after writing all modified Setup item values to CMOS.
Exit Discarding Changes	Exits leaving CMOS unmodified.
Load Setup Defaults	Loads default values for all Setup items.
Load Custom Defaults	Loads settings from custom defaults.
Save Custom Defaults	Saves present Setup values to custom defaults.
Discard Changes	Reads the previous value of all Setup items from CMOS.
Save Changes	Writes all Setup item values to CMOS.

Adaptec SCSI Utility

The Adaptec SCSI Utility detects the SCSI host adapters on the server board.

Use the Adaptec SCSI Utility to:

- Change default values
- Check and/or change SCSI device settings that may conflict with those of other devices in the server

Running the SCSI Utility

You access the Adaptec SCSI Utility when you turn on or reboot your system.

To run the Adaptec SCSI utility, perform the following procedure:

1. Power-on or reboot the system.
2. When this message appears on the video monitor:

   Press Ctrl-A to run SCSI Utility...

3. Press **Ctrl+A** to run this utility. When it appears, choose the host adapter that you want to configure.
4. The SCSI utility starts. When the Adaptec SCSI Utility detects more than one AIC-78xx host adapter, it displays a selection menu listing the bus and device number of each adapter. When the selection menu appears, select the channel you wish to configure as follows:

Bus : Device : Channel	Selected SCSI Adapter
00 : 0C : A	AIC7896
00 : 0C : B	AIC7896

5. Once you select the adapter, the following screen is displayed:

Menu	Description
Configure/View Host Adapter Settings	Configure host adapter and device settings.
SCSI Disk Utilities	The utility scans the SCSI bus for SCSI devices, reports a description of each device. Run these utilities *before* configuring SCSI devices.

6. If you wish to format a disk, verify disk media, or display a list of devices and their SCSI IDs, select “SCSI Disk Utilities”. If you wish to configure the adapter or a device, select “Configure/View Host Adapter Settings”.

Adaptec SCSI Utility Configuration Settings

The following keys are active for all Adaptec SCSI Utility screens:

Key	Action
Arrows	Up and down arrows move from one parameter to another within a screen.
ENTER	Displays options for a configurable parameter. Selects an option.
ESC	Moves back to previous screen or parameter or EXIT if at the Main menu.
F5	Switches between color and monochrome.
F6	Resets to host adapter defaults.

The following table shows the normal settings for the Adaptec SCSI Utility and provides a place for you to record any changes you make to these settings.

Adaptec SCSI Utility Setup Configurations

OPTION	RECOMMENDED SETTING OR DISPLAY ONLY	YOUR CONFIGURATION
SCSI Bus Interface Definitions		
Host Adapter SCSI ID	7	
SCSI Parity Checking	Enabled	
Host Adapter SCSI Termination	Enabled	
Additional Options		
Boot Device Options	Press ENTER for menu	
Boot Channel	A First	
Boot SCSI ID	0	
Boot LUN Number	0	
SCSI Device Configuration	Press ENTER for menu	
Sync Transfer Rate (MB/Sec)	80.0	
Initiate Wide Negotiation	Yes	
Enable Disconnection	Yes	
Send Start Unit Command	Yes	
Enable Write Back Cache	No	
BIOS Multiple LUN Support	No [1]	
Include in BIOS Scan	Yes [1]	
Advanced Configuration Options	Press ENTER for menu.	
Reset SCSI Bus at IC Initialization	Enabled	

[1] No effect if BIOS is disabled.

Adaptec SCSI Utility Setup Configurations (Continued)

OPTION	RECOMMENDED SETTING OR DISPLAY ONLY	YOUR CONFIGURATION
Display <Ctrl-A> Messages During BIOS Initialization	Enabled	
Extended BIOS Translation for DOS Drives >1 GByte	Enabled	
Verbose/Silent Mode	Verbose	
Host Adapter BIOS (Configuration Utility Reserves BIOS Space)	Enabled[1]	
Support Removable Disks Under BIOS as Fixed Disks [1, 2]	Boot Only[1]	
BIOS Support for Bootable CD-ROM	Enabled[1]	
BIOS Support for Int13 Extensions	Enabled[1]	

[1] No effect if BIOS is disabled.
[2] Do not remove media from a removable media drive if it is under BIOS control.

Exiting Adaptec SCSI Utility

To exit the Adaptec SCSI Utility, press ESC until a message prompts you to exit (if you changed any settings, you are prompted to save the changes before you exit).

Installing Video Drivers

After configuring the system, you need to install video drivers to take full advantage of the features of the onboard Cirrus Logic CL-GD5480 super VGA video controller.

- The CD shipped with your system includes video drivers for use with DOS and Windows NT. Check the README.TXT file on the CD for information on installing these drivers.
- For other operating systems, see your OS instructions for installing device drivers.

Configuring System Board Jumpers

Before You Begin

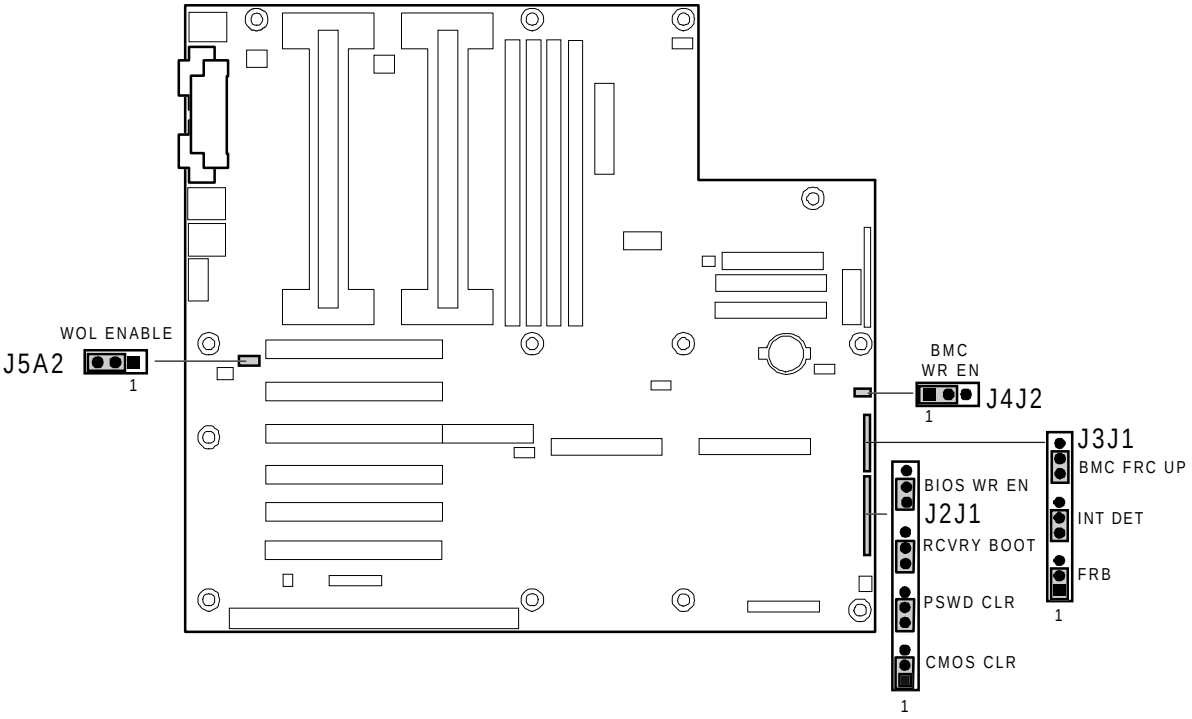
Only a qualified technical person should perform the procedures in this section.

⚠ CAUTION

Electrostatic discharge (ESD) can damage the system board. Modify the system board only at an ESD workstation. Otherwise, wear an antistatic wrist strap attached to chassis ground.

The system board jumpers enable you to set specific operating parameters for your system. A jumper is a small plastic-encased conductor (shorting plug) that slips over two jumper pins.

The "System board Jumpers" illustration shows the location of the system board jumpers. The "System Board Jumper *C*onfigurations" table lists the system board jumpers and their factory default settings.



System Board Jumpers

System Board Jumper Summary

Jumper Block	Function	Pins (default in bold)	What it does at system reset
J5A2	Wake On LAN ENABLE	1-2, Disabled	Disables Wake On LAN. If your power supply does not provide 0.8 A of +5 V Standby current, you must move the WOL Enable jumper to this position.
		2-3, Enabled	Enables Wake On LAN.
J4J2	BMC Write Enable	**1-2, Protect**	BMC boot block is write protected.
		2-3, Erase/Program	BMC boot block is erasable and programmable.
J3J1	FRB Timer Enable	**1-2, Enable**	FRB operation is enabled (system boots from processor 1 if processor 0 does not respond).
		2-3, Disable	FRB is disabled.
J3J1	Chassis Intrusion Detection	**5-6, Enable**	Switch installed on chassis indicates when cover has been removed.
		6-7, Disable	Chassis intrusion switch is bypassed.
J3J1	BMC Forced Update Mode	**9-10, Normal**	System boots normally.
		10-11, Program	System attempts to update BMC firmware.
J2J1	CMOS Clear	**1-2, Protect**	Preserves the contents of NVRAM.
		2-3, Erase	Replaces the contents of NVRAM with the manufacturing default settings.
J2J1	Password Clear	**5-6, Protect**	Maintains the current system password.
		6-7, Erase	Clears the password.
J2J1	Recovery Boot	**9-10, Normal**	System attempts to boot using the BIOS stored in flash memory.
		10-11, Recovery	BIOS attempts a recovery boot, loading BIOS code from a floppy diskette into the flash device. This is typically used when the BIOS code has been corrupted.
J2J1	BIOS Write Enable	**13-14, Protect**	BIOS boot block is write-protected.
		14-15, Erase/Program	BIOS boot block is erasable and programmable.

Moving System Board Jumpers

⚠ CAUTION

Before doing the procedures in this section, make sure that your system is powered off and unplug the AC power cords from the back of the chassis. Failure to disconnect power before moving the jumpers can result in personal injury and equipment damage.

Observe static precautions. Use an antistatic wrist strap.

To configure the system board options:

1. Power off the system and remove the left panel as described in Chapter 4 of this guide.
2. Check to ensure the system power cord is removed from the back of the system.
3. Locate the position of the jumpers on the system board you are changing. To change a jumper setting, use a pair of needle-nose pliers or your fingers to remove the jumper from its current location. Position the jumper over the two pins for the desired setting and press it onto the pins. Be careful not to bend the pins. Refer the System Board Summary table for system board jumper settings.
4. Reinstall the left panel and power up the system.

Resetting the CMOS NVRAM

Use the clear CMOS memory procedures, which includes the reset CMOS NVRAM process, under "Enable F2 Prompt by Changing a Jumper and Using SSU" in Chapter 5.

Clearing and Changing the Passwords

To clear and change the passwords:

1. Power off the system and remove the left panel as described in chapter 4 of this guide.
2. Move the Password Clear jumper from pins 5-6 to pins 6-7. Refer to “Configuring System Board Jumpers” to see the location of this jumper.
3. Power on the system and wait for POST to complete. This automatically clears the old password.
4. Power off the system.
5. Move the Password Clear jumper back to pins 5-6.
6. Replace the panel and power on the system.
7. To specify a new password run the BIOS Setup Utility as described earlier in this chapter.

Recovering the BIOS

Qualified technical personnel should only perform this procedure.

⚠ CAUTION

Leave Recovery Boot jumper at factory-default setting.
A technically qualified person should only move this jumper.

Boot Block Write Protect

The jumper at pins 13, 14, and 15 controls whether the BIOS boot block is protected from being erased and reprogrammed.

⚠ CAUTION

Leave boot block jumper at factory-default setting:
Programming the boot block incorrectly will prevent the system from booting. A technically qualified person should only do programming. The procedure requires a special “Boot Block Update Utility.” Contact your dealer or sales representative for more information.

Fault Resilient Booting (FRB) Timer Enable Jumper

Fault resilient booting insures the system will not stop from a boot problem. Two sets of timers are implemented that will automatically reset the system if the system should halt for some reason.

- FRB 2 - 5 sec timer. If the primary processor does not come up in 5 seconds the system will automatically reset and switch to the secondary processor secondary (if installed otherwise it will try to boot again off of the primary.)
- FRB 3 - 7 minute timer. If the system does not make it up to the end of POST in 7 minutes, the system will automatically reset and try again. It is assumed that the processor failed regardless of what may have caused the system to hang. The primary processor is taken off line and the system will boot off the secondary (if installed otherwise it will try to boot again off of the primary.) Bad memory or a bad plug in card may cause a FRB 3 failure.

All failures are logged to the system event log.

The system will remember all FRB errors and display them at the end of POST until you select the Processor Retest option from the BIOS Setup utility.

⚠ CAUTION

For normal operation leave FRB Timer Enable jumper at factory-default setting.

To disable the FRB Timer Enable:

1. Power off the system and remove the left panel as described in Chapter 4 of this guide.
2. Move the FRB Timer Enable jumper from pins 1-2 to pins 2-3. Refer to "Configuring System Board Jumpers" to see the location of this jumper.
3. Replace the panel and power on the system.
4. Power on the system and wait for POST to complete.
5. Run the SSU to configure the system.

Chassis Intrusion Detection Jumper

The chassis contains an alarm switch that sends a notification signal to the server management software if a cover is removed. The jumper at pins 5, 6, and 7 controls whether this alarm feature is enabled or disabled.

⚠ CAUTION

For normal operation leave Chassis Intrusion Detection jumper at factory-default setting.

To disable the chassis intrusion switch:

1. Power off the system and remove the left panel as described in Chapter 4 of this guide.
2. Move the chassis intrusion detection jumper from pins 5-6 to pins 6-7 to disable the alarm switch.
3. Reinstall the side cover for your safety, and connect the power cord to the system.
4. Power on the system on, and wait for POST to complete.
5. Run the SSU to configure the system.

BMC Forced Update Mode

⚠ CAUTION

Leave BMC Forced Update Mode jumper at factory-default setting: Setting this jumper incorrectly will prevent the system from booting. A technically qualified person should only do programming. Contact your dealer or sales representative for more information.

4

Upgrading Your System

- General Information
- Static Precautions
- Preparing Your System for Upgrade
- Equipment Log
- Opening the Front Door
- Removing a Side Panel
- Installing a Side Panel
- Modifying the System Board
- Option Boards
- Hard Disk Drives
- Removable Media Devices

General Information

WARNING

The DC push-button on/off switch on the front panel does not turn off the system AC power. Also, +5vdc is present on the system board whenever the AC power cords are connected between the system and an AC outlet. Before doing the procedures in this manual, make sure that your system is powered off and unplug the AC power cords from the back of the chassis. Failure to disconnect power before opening your system can result in personal injury and equipment damage.

CAUTION

The server management logic on your system board monitors and logs system voltage changes. When powering down your system you may experience a 1–5 second delay from the time you press the push-button power on/off switch on the front panel and your system powering down. This is normal system operation and is required by the server management logic.

CAUTION

Operating your system with the side panels removed can damage your system components. For proper cooling and airflow, always replace the side panels before powering on your system.

Note: Your system error log will be lost, if your system ac power source is off or disconnected.

Contact your sales representative or dealer for a list of approved optional peripheral devices.

Static Precautions

An electrostatic discharge (ESD) can damage disk drives, option boards, and other components. You can provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground when handling system components.

Electronic devices can be easily damaged by static electricity. To prevent damage, keep them in their protective packaging when they are not installed in your system.

Preparing Your System for Upgrade

Depending on the upgrade, you will need one or more of the following tools:

- Phillips screwdriver (#1 bit and #2 bit)
- Flat-head screwdriver
- Small needle nose pliers
- Pen or pencil
- ESD workstation or antistatic wrist strap (recommended)

Equipment Log

Use the equipment log form located at the end of this manual to record the model and serial number of your system, all installed options, and any other pertinent information specific to your system. You will need this information when configuring your system.

Opening the Front Door

To open the front door (see "Front View with Front Door Opened" in Chapter 2.)

Removing a Side Panel

To install options in your system, you must remove the side panel on the left side of the system (as viewed from the front). The side panel on the right side of the system (as viewed from the front) only has to be removed when adding removable media devices or a second power supply. The right side panel removes in the same manner as the left side panel.

⚠ CAUTION

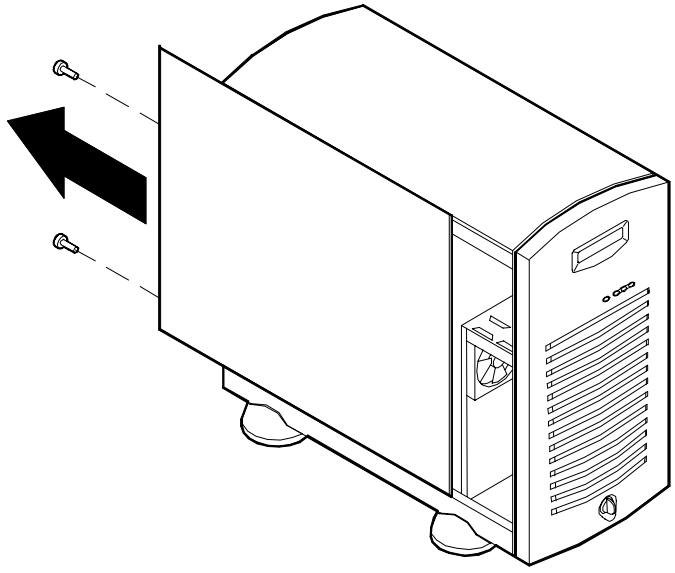
For proper cooling and airflow, do not operate the system with the side panels removed. Always replace the panels before powering on the system.

⚠ WARNING

If you are removing the side panel after the system is set up, you must first power off the system and all external devices and then **Unplug** the system power cord

To remove a side panel:

1. Power off the system and ensure it is disconnected from the ac wall outlet.
2. The side panel is secured to the chassis with two screws. Remove the screws securing the side panel. Save the screws for reattaching the side panel.
3. Slide the side panel toward the rear of the chassis. This unlocks the locking fingers behind the side panel.
4. Pull the side panel out and away from the chassis.



Removing a System Side Panel

Installing a Side Panel

1. Before replacing the side panel, make sure no tools or loose parts have been left inside the system chassis.
2. Make sure all option boards are firmly seated in their respective slots and that all interior cables are properly connected.
3. Insert the metal tabs on the top and bottom of the side panel into their slots on the chassis. Slide the side panel forward as far as it will go.
4. Replace the two side panels retaining screws.

> ***Note:*** If your system is already set up, plug the system back in, reconnect the peripherals, and power on the peripherals and system.

Modifying the System Board

The following sections provide procedures for upgrading and configuring the system board in your system. Topics covered include:

- Replacing the real-time clock battery
- Replacing the processor
- Installing or removing DIMMs.

⚠ CAUTION

Electrostatic discharge (ESD) can damage add-in boards and other components; place them on an antistatic surface. Modify the system board only at an ESD workstation. Otherwise, wear an antistatic wrist strap attached to chassis ground.

Replacing the Real-time Clock Battery

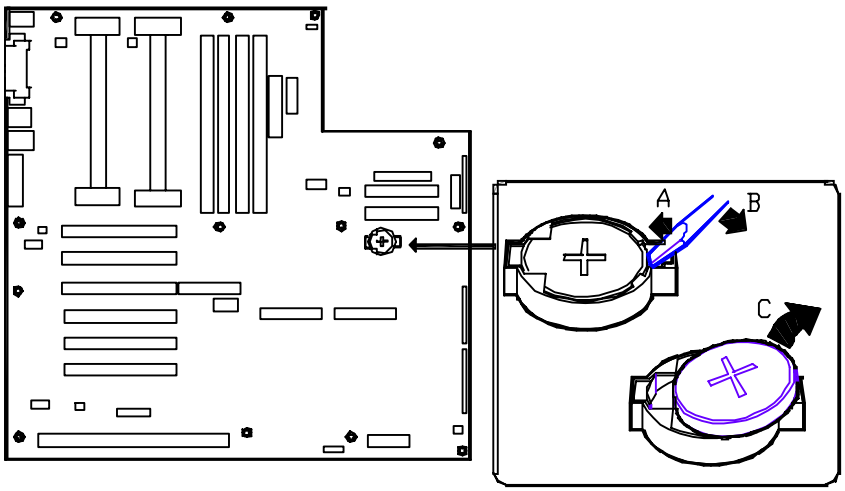
You may need to replace the real-time clock battery because of its life span. The battery (Vendor Part #CR2032) is a commodity part available through many vendors. Notice the plus (+) sign on the battery. This sign will assist you in correctly positioning the battery on the system board.

⚠ CAUTION

Danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by manufacturer. Dispose of lithium batteries as required by local ordinance or as normal waste if no local ordinance exists. Do not expose the component to excessive heat or fire. Keep all batteries away from children

⚠ CAUTION

Observe static precautions. Use an antistatic wrist strap.



Replacing the Real-Time Clock Battery

1. Power off the system and remove the left side panel as described earlier in this chapter.
2. Remove the plastic retainer on the lithium battery socket.
3. Insert the tip of a small flat-bladed screwdriver, or equivalent, under the tab in the plastic retainer (A in figure).
4. Gently push down on the screwdriver to lift the battery (B).
5. Remove the battery from its socket (C).
6. Dispose of the battery according to local ordinance.
7. Remove the new lithium battery from its package, and, being careful to observe the correct polarity, insert it in the battery socket.
8. Reinstall the plastic retainer on the lithium battery socket.
9. Replace the side panel, plug in the system power cord, and turn on the system.
10. Run the BIOS Setup to restore the configuration settings to the real-time clock.

Replacing a Processor

This subsection provides the procedure for upgrading and configuring the Processors in your system. The system board has sockets for two processors. Each processor is packaged either in a Single Edge Contact Cartridge (SECC) or Single Edge Contact Cartridge Version 2 (SECC2).

The SECC packaged cartridge includes:

- processor core with an integrated 16 KB primary (L1) cache
- secondary (L2) cache
- thermal plate
- back cover.

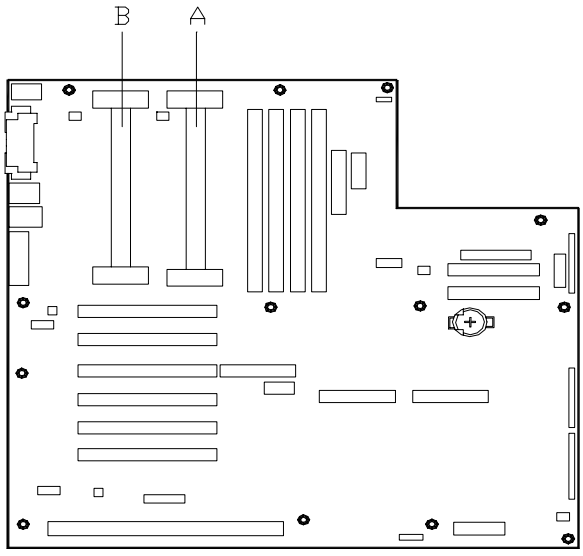
The SECC2 packaged cartridge includes:

- processor core with an integrated 16 KB primary (L1) cache
- secondary (L2) cache.
- back cover.

The primary processor connector is shown at (A) in the illustration below. The secondary processor connector is shown at (B).

⚠ CAUTION

Electrostatic discharge (ESD) can damage components; place them on an antistatic surface. Modify the system board using an antistatic wrist strap attached to chassis ground.



Replacing a Processor

⚠ WARNING

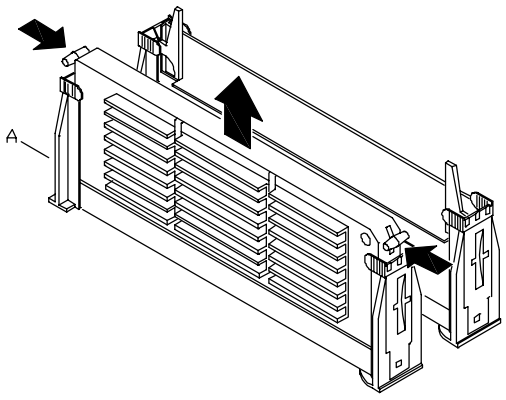
If the system has been running, any processor and heat sink already installed on the board will be hot. To avoid the possibility of a burn, let the components cool for 10 minutes before continuing with the procedures described here

1. Power off the system and remove the left side panel as described earlier in this chapter.

⚠ CAUTION

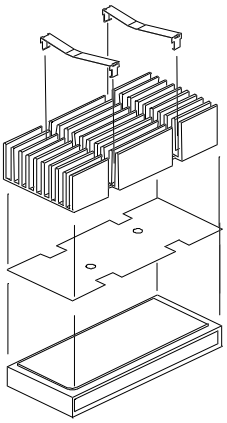
Observe static precautions. Use an antistatic wrist strap. Hold the processor only by its edges.

2. If your system has one processor and you would like to add a second processor, contact your Service Representative for assistance.
3. If your system has one processor and you are replacing it, leave the termination board intact in the empty secondary processor connector. Remove the processor you want to replace.
4. If your system has two processors and you are replacing one or both, remove the appropriate one(s).
5. Press the processor latches toward the center of the SEC cartridge to free them from the retention module (see A in Figure "Removing a Processor").
6. Lift the SEC cartridge upward, out of the retention module.
7. Put the processor in a piece of conductive foam and store in an antistatic package.



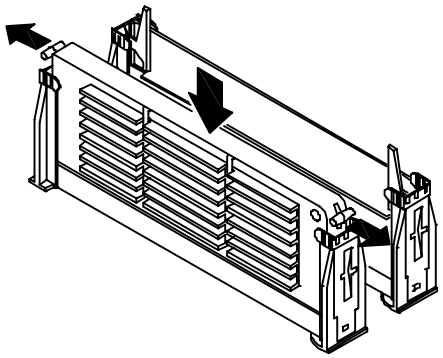
Removing a Processor

8. Place the thermal pad on top of the processor so that the holes in the thermal pad line up with the holes in the processor.
9. Position the heat sink on top of the processor.
10. Install the two clips that secure the heat sink to the processor.



Assembling the Processor

11. Position the processor so that the heat sink faces to the left of the system board. Slide the processor into the retention module. Ensure that the alignment notch in the SEC cartridge fits over the plug in Slot 1. Push down firmly, with even pressure on both sides of the top, until the SEC cartridge is seated.
12. To lock in the processor, push the latches outward until they click into place in the retention module (see figure, below). The latches must be secured for proper electrical connection of the processor.



Locking in the Processor

13. After you have installed a new processor, you must run the BIOS Setup Utility (F2) to configure its speed. Refer to Chapter 3, “Configuring Your System.”
14. Replace the left side panel, plug in the system power cords, and power up the system.

⚠ WARNING

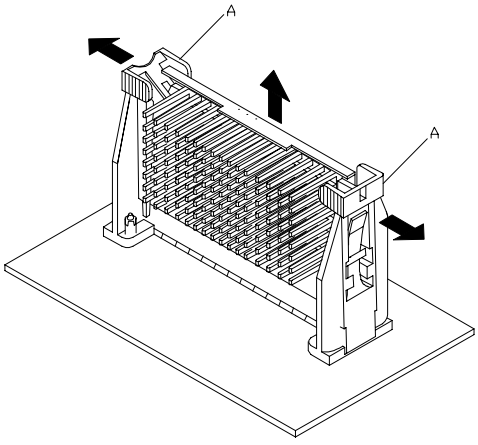
If the system has been running, any processor and heat sink already installed on the board will be hot. To avoid the possibility of a burn, let the components cool for 10 minutes before continuing with the procedures described here

1. Power off the system and remove the left side panel as described earlier in this chapter.

⚠ CAUTION

Observe static precautions. Use an antistatic wrist strap. Hold the processor only by its edges.

2. If your system has one processor and you would like to add a second processor, then you must contact your Service Representative for assistance.
3. If your system has one processor and you are replacing it, leave the termination board intact in the empty secondary processor connector. Remove the processor you want to replace.
4. If your system has two processors and you are replacing one or both, remove the appropriate one(s).
5. Pull the processor latches, Item A in Figure "Removing a Processor" below, out away from the edges of the SEC cartridge to free them from the Universal Retention Module (URM).
6. Lift the SEC cartridge upward, out of the URM and place it on a grounded, static-free surface or conductive foam pad.
7. Put the old processor in a piece of conductive foam and store in an antistatic package.



Removing a Processor

8. Remove the new processor from its antistatic package and place it on a grounded, static-free surface or conductive foam pad.

9. Position the processor back into the URM. Ensure that the alignment notch in the SEC cartridge fits over the plug in Slot 1. Push down firmly, with even pressure on both sides of the top, until the SEC cartridge is seated.

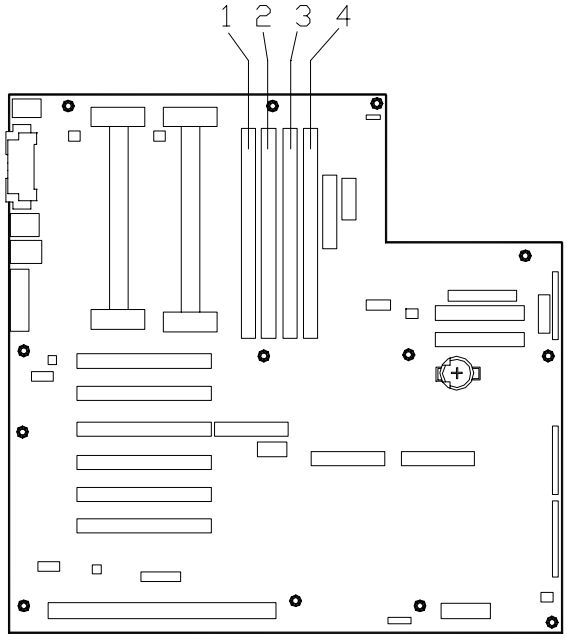
10. To lock in the processor, push the latches inward until they secure the SEC cartridge into place in the URM, Item A in Figure "Removing a Processor" above. The latches must be secured for proper electrical connection of the processor.

11. After you have installed a new processor, you must run the BIOS Setup Utility (F2) to configure its speed. Refer to Chapter 3, “Configuring Your System.”

12. Replace the left side panel, plug in the system power cords, and power up the system.

DIMMs

The system board contains four DIMM sockets labeled 1 through 4. Each socket can hold a single 72-bit DIMM module with 32MB, 64MB, 128MB, or 256MB of memory. When all four sockets are populated, the system board supports a maximum of 1 GB of memory with 256MB DIMMs. A DIMM will always be installed in the bottom socket. When you install additional DIMMs, you must start with the first empty socket above DIMMs already installed. When you remove DIMMs, you must start with the first DIMM socket closest to the top edge of the system board.



DIMM Locations

Memory DIMM Configurations

This table lists the distribution of DIMMs for specific memory configurations.

System Capacity (MB)	Capacity per DIMM slot (MB) Any DIMM slot order			
	Slot 1	**Slot 2**	**Slot 3**	**Slot 4**
32	32			
64	32	32		
64	64			
96	32	32	32	
96	64	32		
128	32	32	32	32
128	64	32	32	
128	64	64		
128	128			
160	64	64	32	
160	64	32	32	32
160	64	64	32	32
192	64	64	32	32
192	64	64	64	
192	128	32	32	
192	128	64		
224	64	64	64	32
224	128	32	32	32
224	128	64	32	
256	64	64	64	64
256	128	64	32	32
256	128	64	64	
256	128	128		
256	256			
288	128	64	64	32
288	128	128	32	
320	128	64	64	64
320	128	128	32	32
320	128	128	64	
352	128	128	64	32
384	128	128	64	64
384	128	128	128	
384	256	128		
416	128	128	128	32
448	128	128	128	64
512	128	128	128	128
512	256	256		
640	256	256	128	
768	256	256	128	128
768	256	256	256	
896	256	256	256	128
1024	256	256	256	256

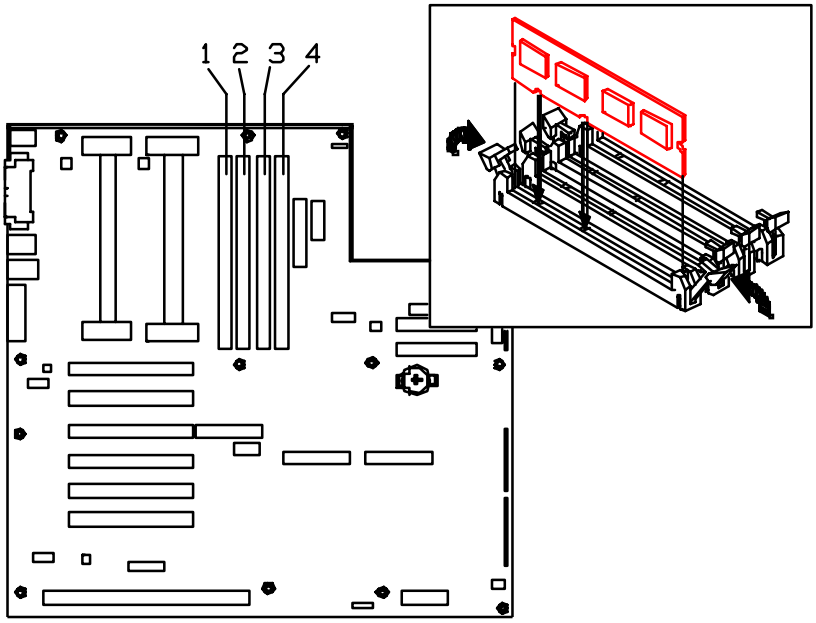
Installing DIMMs

1. Power off the system and remove the left side panel as described earlier in this chapter.

CAUTION

Observe static precautions. Use an antistatic wrist strap.
Hold DIMMs only by their edges.

2. Holding the DIMM module only by the edges, remove it from its antistatic package.
3. Position the DIMM so that the two notches in the bottom edge of the DIMM align with the keyed socket.



Inserting Memory DIMMs

4. Insert the bottom edge of the DIMM into the socket, and press down firmly on the DIMM until it seats correctly.
5. Gently push the plastic ejector levers on the socket ends to the upright position.
6. Repeat the steps to install each DIMM.
7. Replace the left side panel, plug in the system power cord, and turn on the system.

⚠ CAUTION

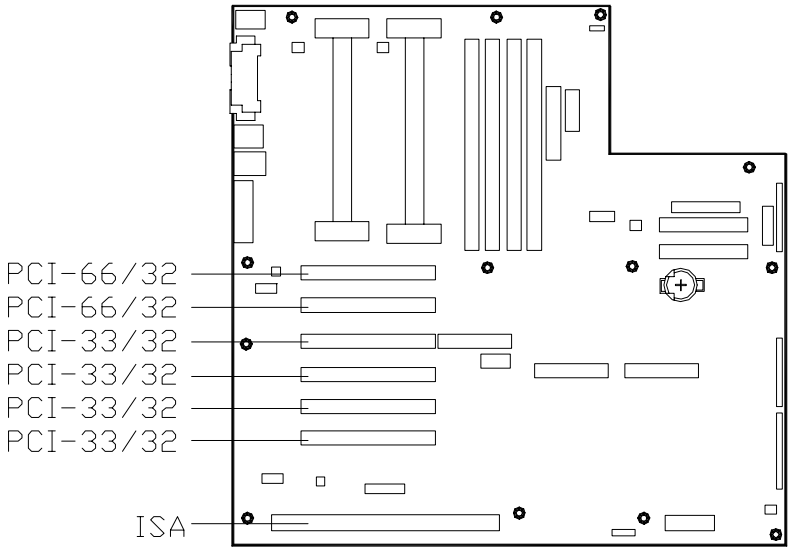
Use extreme care when removing a DIMM. Too much pressure can damage the socket slot. Apply only enough pressure on the plastic ejector levers to release the DIMM

1. Power off the system and remove the left side panel as described earlier in this chapter.
2. Gently push the plastic ejector levers out and down to eject a DIMM from its socket.
3. Hold the DIMM only by its edges, being careful not to touch its components or gold edge connectors. Carefully lift it away from the socket, and store it in an antistatic package.
4. Repeat the above steps to remove the remaining DIMMs.
5. Replace the side panel, plug in the system power cord, and turn on the system.

Option Boards

This section describes how to install and remove ISA and PCI option boards. The system board has one ISA bus expansion slots and four PCI-33/32 bit and two PCI-66/32 bit bus expansion slots.

The high-performance PCI local bus allows the adoption of newer networking technology, such as 100 Mb/second Ethernet NICs, with a minimum of effort and without concern for I/O bottlenecks. The PCI local bus offers up to 133 Mb/second bandwidth.



PCI and ISA Slot Locations

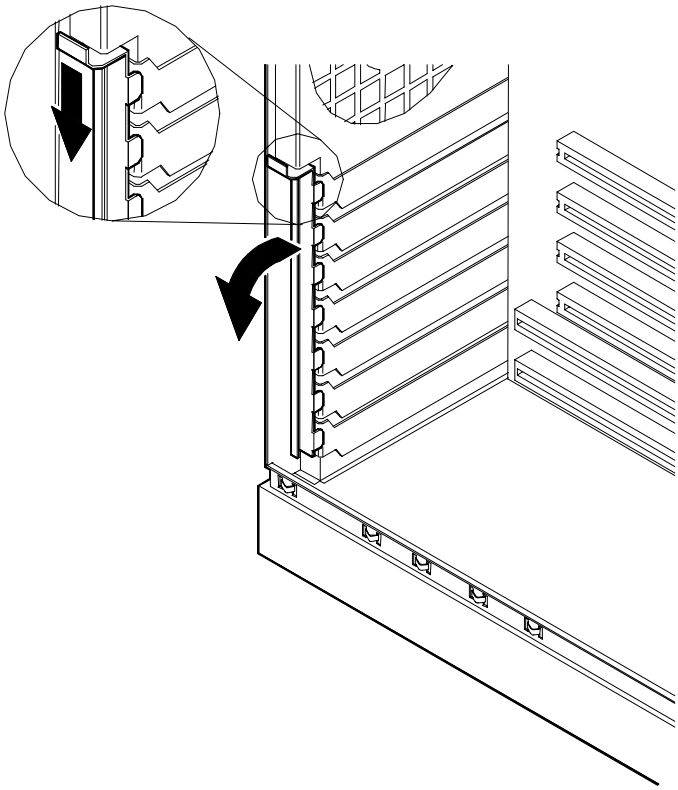
Installation Considerations

Newer adapters, designed for Plug-and-Play systems, are automatically configured by the system without any user intervention. Older ISA adapters must be manually configured as detailed below. Once the manual configuration is complete, the Plug-and-Play adapters are configured around the manually configured adapters without causing any resource conflicts.

ISA adapters can be Plug-and-Play. ISA adapters that are not Plug-and-Play must be manually configured following the instructions supplied with the board. The configuration is defined to the system by creating the ISA configuration file when running the SSU. If you are adding a non-Plug and Play ISA option board, run the SSU before installing the board. For details on running the SSU, refer to Appendix B.

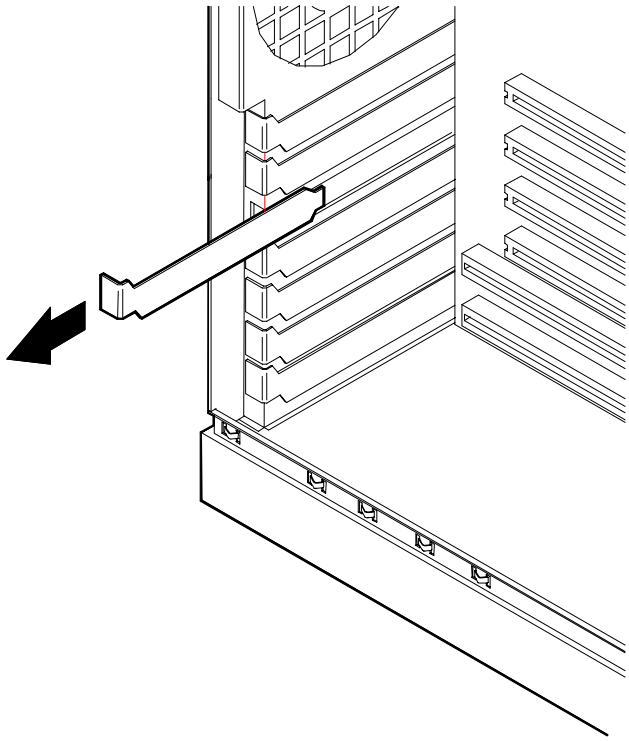
Installing an Option Board

1. Power off the system and remove the left side panel as described earlier in this chapter.
2. Remove and save the expansion slot retainer bar by pressing down on its top snap fastener and pulling the bar out.



Removing the Expansion Slot Retainer Bar

3. Remove and save the expansion slot cover by sliding it straight back and out of the slot.



Removing the Expansion Slot Cover

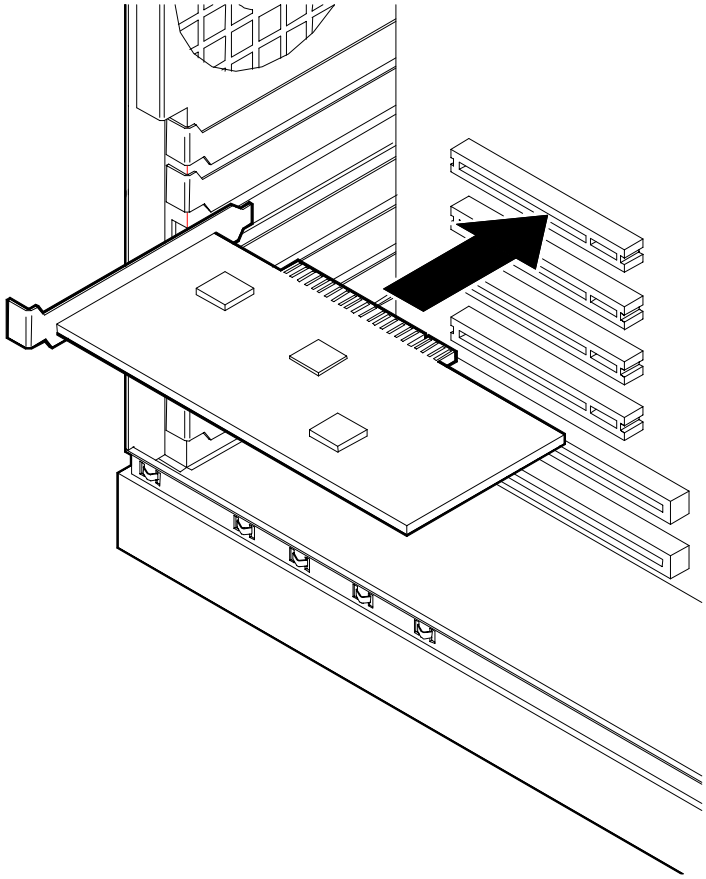
⚠ CAUTION

Observe static precautions. Use an antistatic wrist strap.

4. Remove the option board from its protective wrapper, holding the board only by the edges. Do not touch the board components or the gold connectors.
5. Record the option board serial number in the equipment log.
6. Set any board jumpers or switches as described in the documentation that comes with the option board.
7. Refer to the documentation accompanying the option board for information on whether the board is a PCI or ISA board. Refer to "Option Board Hardware Configurations" table to determine the recommended option board slot assignment and configuration parameters.

Note: If you are adding a non-Plug and Play Legacy ISA option board, run the SSU before installing the board. For details on the SSU, refer to Appendix B.

8. Holding the board by its top edge or upper corners, firmly press the board into an expansion slot on the system board. The tapered foot of the option board retaining bracket must fit into the mating slot in the expansion slot.



Installing an Option Board

9. Align the rounded notch in the option board retaining bracket with the alignment tab in the expansion slot frame. The retaining bracket fits into the space that was occupied by the expansion slot cover.
10. Be sure to push the bracket slot up against the expansion slot frame. If this is not done, the bracket may interfere with an adjacent bracket.
11. Install the previously removed expansion slot retainer bar by pressing its top fastener into the top of the expansion slot frame. The bottom tapered tab of the expansion slot retainer bar fits into the mating slot on the bottom of the expansion slot frame.
12. Connect any external cables (if they are needed) to the installed option board.
13. Replace the left side panel, plug in the system power cord, and power on the system.

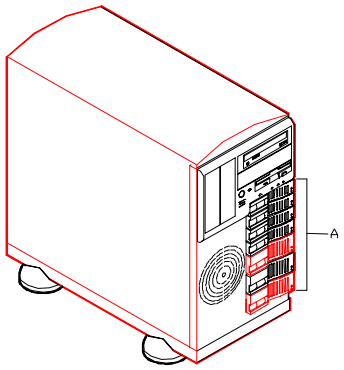
Removing an Option Board

> ***Note:*** Expansion slot covers must be installed on all vacant slots to maintain the electromagnetic emissions characteristics of the system and to assure proper cooling of the system components.

1. Power off the system and remove the left side panel as described earlier in this chapter.
2. Disconnect any cables attached to the option board you are removing.
3. Remove and save the expansion slot retainer bar by pressing down on its top fastener and pulling the bar out.
4. Hold the board at each end and carefully rock it back and forth until the edge connectors pull free. Make sure that you do not scrape the board against other components.
5. Remove the board from the expansion slot and place it in an antistatic wrapper. If you are replacing a board, go to "Installing an Option Board" earlier in this chapter, otherwise continue.
6. Install an expansion slot cover over the vacant slot.
7. Install the previously removed expansion slot retainer bar by pressing its top fastener into the lock plate at the top of the expansion slot frame. The bottom tapered tab of the expansion slot retainer bar fits into the mating slot on the bottom of the expansion slot frame.
8. Replace the left side panel, plug in the system power cords, and power on the system.
9. If you removed a non-Plug-and-Play ISA option board, run the SSU to configure the system as described in the “Configuring Your System” chapter.

Hard Disk Drives

Your system supports a variety of SCSI hard disk drives. The SCSI drives must use the industry standard 80-pin Single Connector Attachment (SCA) connector. Contact your sales representative or dealer for a list of approved devices. The internal hard disk drives are located in the SCSI Disk Drive Bays (A).



SCSI Disk Drive Bay Locations

If you are adding or removing a SCSI hard disk device, consider the following:

CAUTION

Do not hot swap a non-LVD-disk-drive into an LVD-disk-drive only system for it may cause data corruption. The only way a non-LVD-disk-drive can be used with an all LVD-disk-drive system is by first powering down the system, installing the non-LVD-disk-drive, and then powering the system back up.

Note: Installing a non-LVD-disk-drive into an all LVD-disk-drive system causes all the drives to operate in the non-LVD mode.

The hard disk SCSI address assignment is:

Bay	Device	SCSI ID Address
1	First 1.6 inch Hard Disk (Bottom)	0
2	Second 1.6 inch Hard Disk	1
3	Third 1.6 inch Hard Disk	2
4	Fourth 1.0 inch Hard Disk	3
5	Fifth 1.0 inch Hard Disk	4
6	Sixth 1.0 inch Hard Disk	5
7	Seventh 1.0 inch Hard Disk (Top)	6

Installing or Swapping a Hard Disk Drive in a Hot-swap Bay

This procedure describes installing a new drive or swapping out a faulty drive from one of the seven hot-swap SCSI disk drive bays. The 3 1/2-inch SCSI drives must use the industry standard 80-pin Single Connector Attachment (SCA) connector. Each drive must be installed in a drive carrier.

Note: To order a disk with a carrier, contact your sales representative or dealer.

- If installing new drives, follow an installation scheme starting with the bottom drive. Fill the bays bottom to top.

Note: ESD can damage disk drives, boards, and other parts. This system can withstand normal levels of environmental ESD while you are hot-swapping SCSI hard drives. However, we recommend that you do all procedures in this chapter only at an ESD workstation or provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground—any unpainted metal surface—on your system when handling parts.

⚠ CAUTION

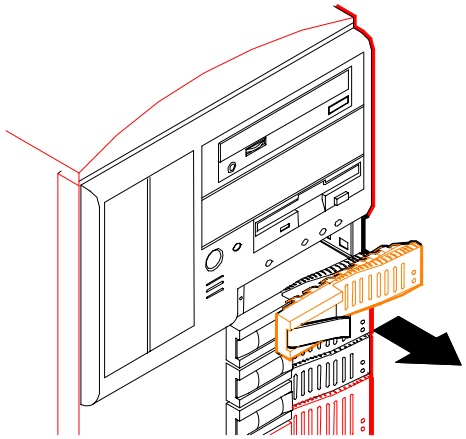
Drive manufacturer's caution against moving a disk drive that is still spinning because of possible damage to the drive.

After you determine which drive has been flagged as faulty, the procedure is the same to swap a drive or to install one for the first time.

Installing or Swapping a Hard Disk Drive

1. Open the front door as described earlier in this chapter.
2. If installing a hard disk drive in a disk carrier for the first time, perform the following procedures:
   - Pull the handle out of the disk carrier's front panel and remove the front panel from the SCSI hard disk drive bay.

> ***Note:*** The disk carrier's front panel is no longer needed.



Removing the Disk Carrier's Front Panel

   - Go to step 5.
3. If swapping a hard disk drive, remove its carrier from the SCSI hard disk drive bay and perform the following procedures:

> **⚠ CAUTION**
> Depending on the drive fault, the drive may be still spinning when you remove it. Follow the next steps exactly when removing drives.

   - Pull the disk carrier's handle out.
   - Pull the faulty disk drive out of the bay far enough to disengage the drive connector from the backplane. Wait 30 seconds until the drive spins down.
   - Remove the carrier from the drive bay.

4. Remove the hard disk drive from the disk carrier by removing the four screws. See Figure "Securing the Drive in the Carrier."

5. Remove the new drive from its protective wrapper, and place on an antistatic surface.

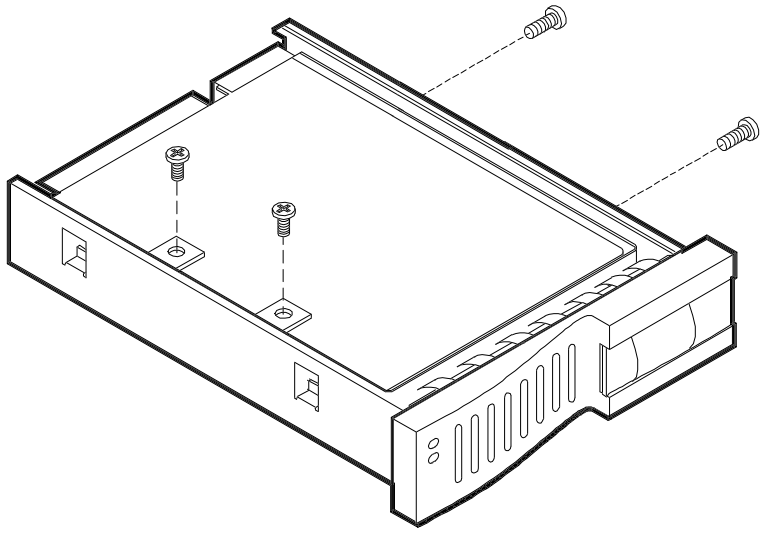
⚠ CAUTION

Observe static precautions. Use an antistatic wrist strap.

6. Record the drive model and serial numbers in the equipment log.

7. Install the drive in the drive carrier, See Figure "Securing the Drive in the Carrier."

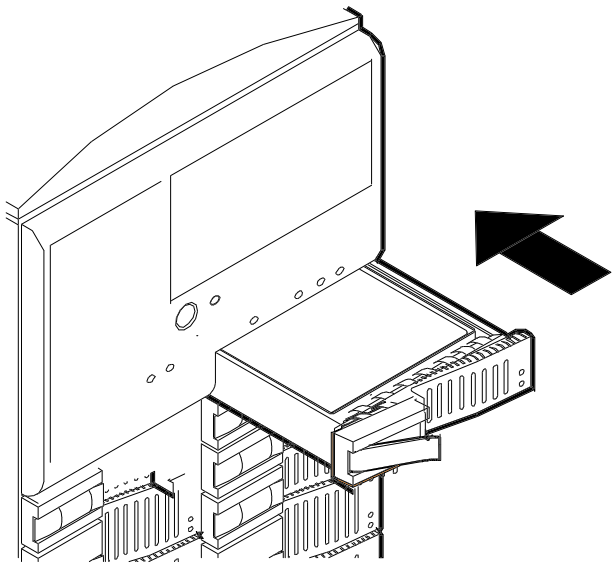
   - Place the drive in the carrier, with its connector facing the back of the carrier.
   - Turn the drive and carrier over and secure the drive in the carrier with the four screws supplied with the disk drive.



Securing the Drive in the Carrier

8. Install the drive carrier with drive into the bay (see Figure "Installing a Disk Carrier into the Bay") as follows:

   - Open the drive carrier's handle.
   - Align the drive carrier with the bay guide rails.
   - Slide the drive carrier into the bay until it docks with the SCSI backplane connector.
   - Push on the carrier until the drive is completely seated into the SCSI backplane connector, and the carrier handle is flush with the front of the carrier.

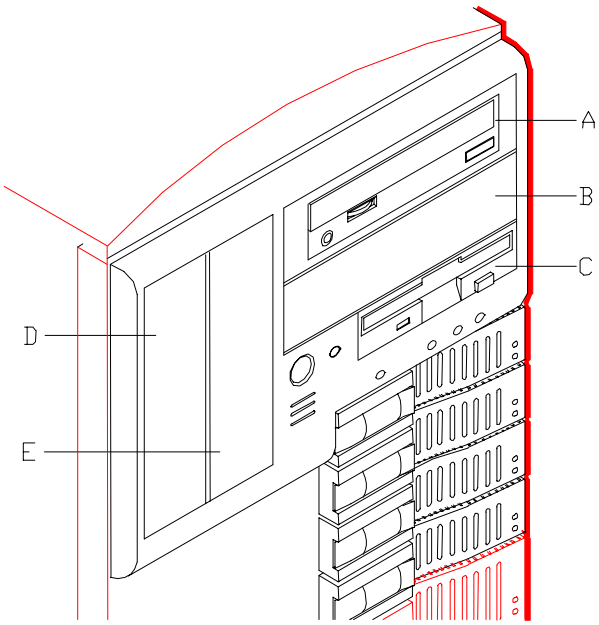


Installing a Disk Carrier into the Bay

9. Close the front door on the system. If necessary, configure the system as described in Chapter 3 "Configuring Your System".

Removable Media Devices

A variety of IDE and SCSI removable media devices can be installed in peripheral bays A, B, C, D, and E. An IDE CD-ROM is always mounted in bay A. A 3.5-inch diskette drive is always mounted in bay C. Other devices should be installed in the first available bay from the top (bay B). Contact your sales representative or dealer for a list of approved devices.



If you are adding or removing an IDE removable media device, consider the following:

- The system board supports a primary and secondary IDE channel connector. Each of these supports two devices, for a total of four IDE devices. Your system includes the primary channel IDE interface cable.
- A first (master) device and a second (slave) device are supported on both the primary and secondary IDE connector. Jumpers on the device determine the device configuration, master versus slave. Cable Sense (CS) device configuration is not supported.
- Your system includes a three-connector IDE cable connecting the CD-ROM to the system board primary IDE connector. The CD-ROM that comes with your system is set as the master device. A second IDE connector is available to connect a slave IDE removable media device.
- If only one device is on an IDE channel connector it must be set as the master device.

If you are adding or removing a SCSI removable media device, consider the following:

- The optional SCSI tape drive address assignment is 2.
- The SCSI termination resistors must be installed in the last SCSI drive of the daisy chain cabling. If the SCSI tape drive is your only SCSI device on the SCSI controller B, termination must be enabled in the tape drive.

Installing a 5.25-Inch Media Device

⚠ CAUTION

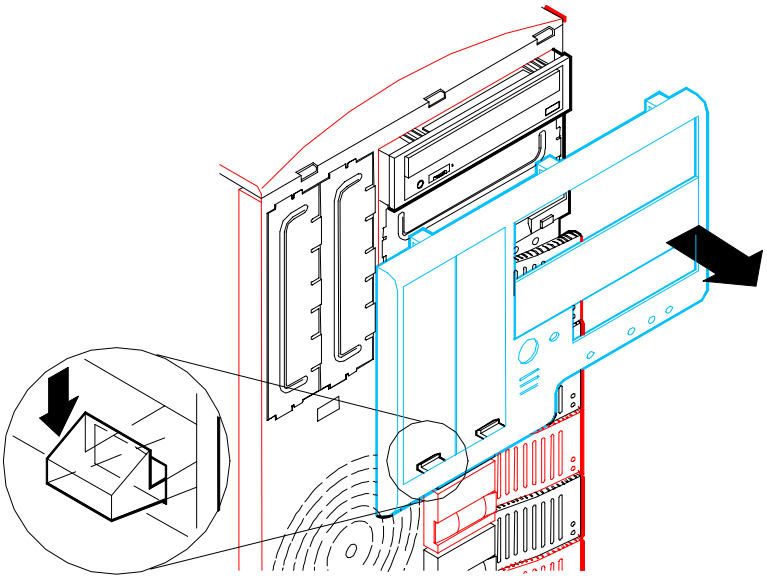
CD-ROM devices contain a laser system and are classified as CLASS 1 LASER PRODUCTS. To use these devices, thoroughly read the documentation provided by the CD-ROM manufacturer, and keep the documentation for future reference. In case of any trouble with a CD-ROM, please contact your nearest service representative. To prevent direct exposure to the laser beam, do not try to open the enclosure. Use of controls or adjustments or performance of procedures other than those specified in the CD-ROM manufacturer's documentation may result in hazardous radiation exposure

1. Power off the system, unplug the system power cords, and remove the appropriate side panel depending upon the bay you are installing the media device in and as described earlier in this chapter.
2. Open the front door as described earlier in this chapter.

⚠ CAUTION

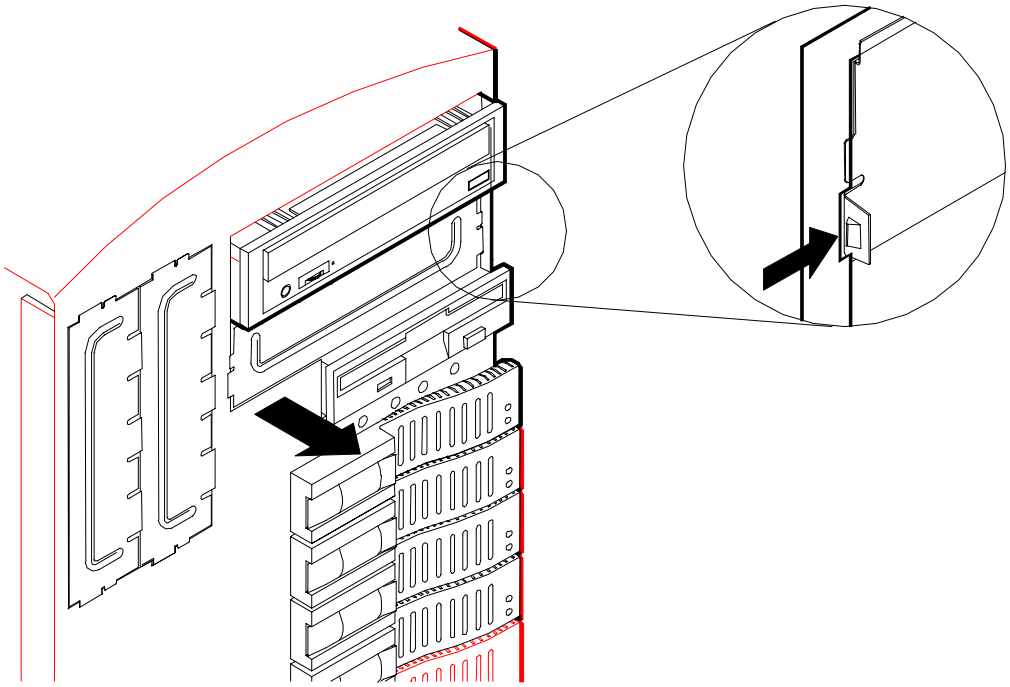
Observe static precautions. Use an antistatic wrist strap.

3. Carefully remove the front system bezel by releasing its two plastic snap tabs on the back of the bezel and pulling it out (see Figure below).



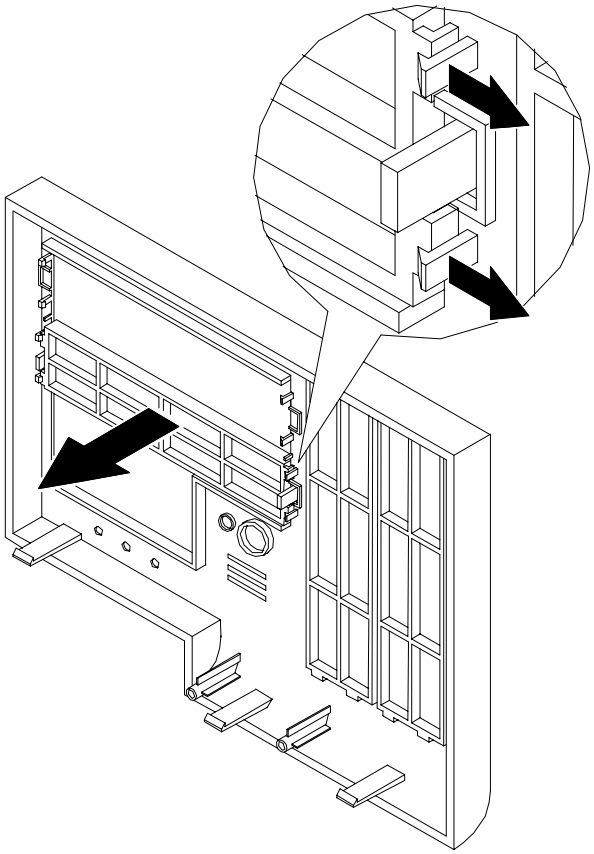
Removing the Front System Bezel

4. Remove the EMI metal shield covering the bay where you are installing a media device as shown below. The metal shield is removed by pulling on the tabs at the top and bottom of the metal shield.



Removing an EMI Metal Shield

5. Remove the filler panel from the system bezel corresponding to the bay where you are installing a media device as shown below. The filler panel is released by pressing the plastic snap tabs located on the back of the system bezel. Save the panel for reinstallation.

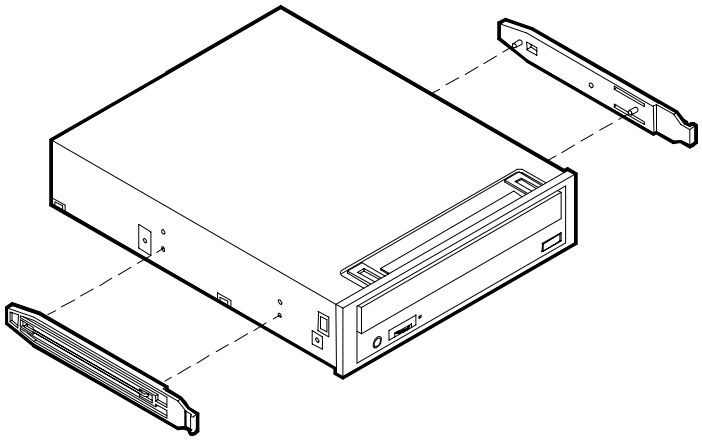


Removing a Filler Panel

6. Remove the device from its protective wrapper and place it on an antistatic surface. Record the drive model and serial number in the equipment log.
7. Set any drive jumpers or switches before you install the drive. See the documentation that comes with the device for jumper or switch information.

> ***Note:*** If the drive comes with drive rails, do not use them. Remove any rails already attached.

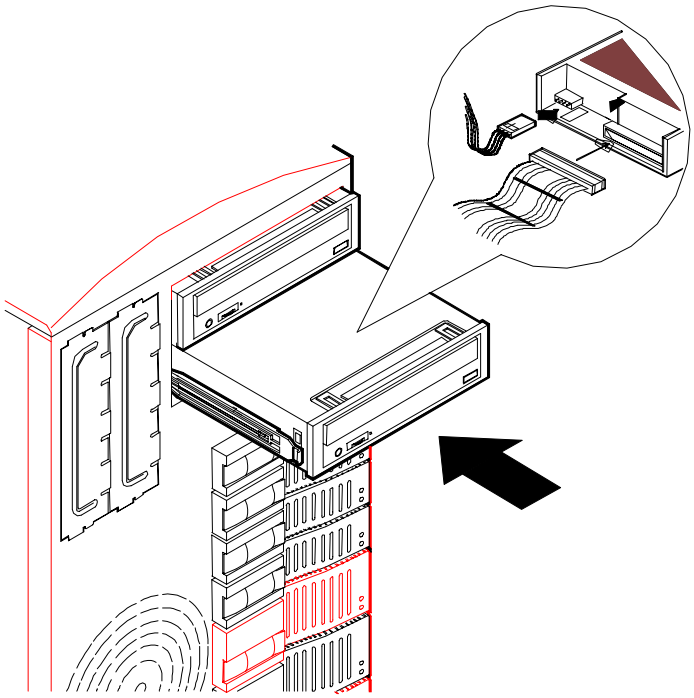
8. Attach the device side rails supplied with the system as shown below.



Attaching the Device Side Rails

9. Install the media device into the bay as follows:

- Move any cables in the bay out of the way.
- Align the rails on the media device with the supports in the bay.
- Slide the device into the bay until it locks in place.



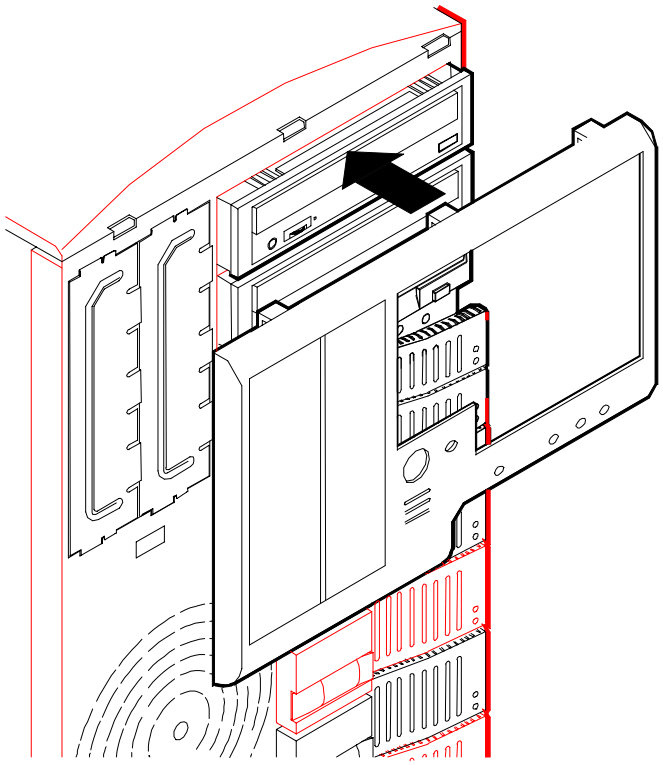
Installing a Removable Media Device

10. Connect the interface and power cables to the device as follows (see Figure above):

    - If you are installing a 5 1/4-inch tape drive or other IDE device, align and connect the drive signal cable and the system power cable to their connectors. The cable connector for the 5 1/4-inch device is keyed to fit only in the correct position. The red edge of the cable goes to pin 1 on the cable connector. Align the red edge of the connector with pin 1 (notched end) on the drive connector.
    - If you are installing a SCSI device, connect the SCSI cable and system power cable. Be sure to align the SCSI cable connector (not keyed) with the device connector.

11. Carefully reinstall the front system bezel by inserting its top plastic tabs into the chassis top tab slots and then pushing its bottom portion straight in against the chassis (see Figure below).

12. Close the front door, reinstall the side panel, and power on the system.



Installing the Front System Bezel

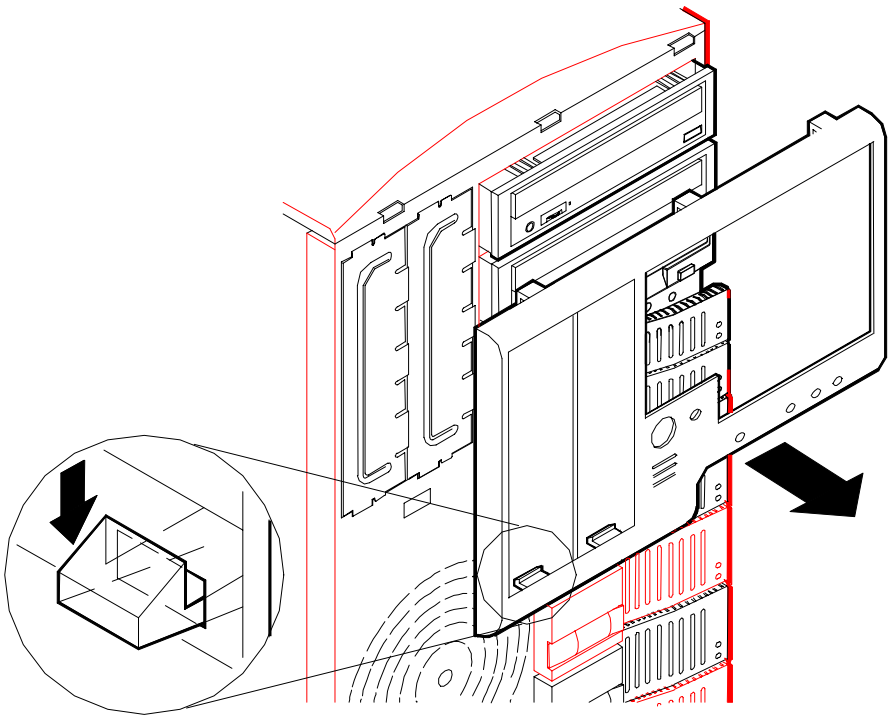
Removing a 5.25-Inch Device

1. Power off the system, unplug the system power cords, and remove the appropriate side panel depending upon the bay you are removing the media device from and as described earlier in this chapter.
2. Open the front door as described earlier in this chapter.
3. Observe static precautions. Use an antistatic wrist strap.

⚠ CAUTION

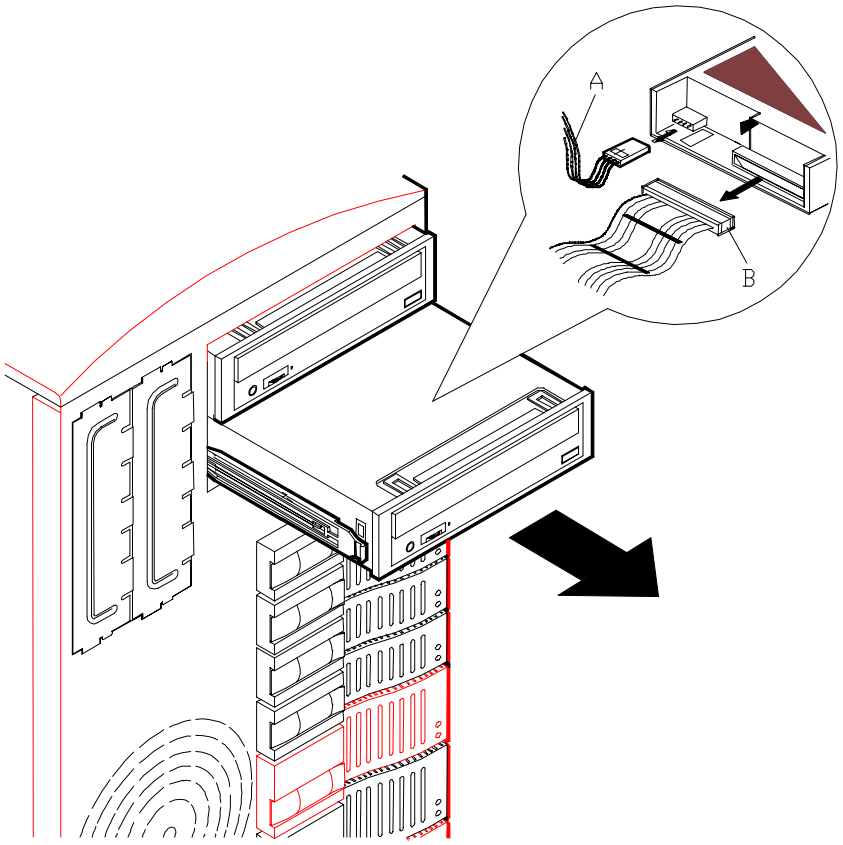
Observe static precautions. Use an antistatic wrist strap.

4. Carefully remove the front system bezel by releasing its two plastic snap tabs on the back of the bezel and pulling it out (see Figure below).



Removing the Front System Bezel

5. Disconnect the power cable (A) and ribbon data cable (B) from the device you are removing.



Removing a Removable Media Device

6. Remove the device from the peripheral bay by pushing in on its drive rail clips and pull the device completely out of the bay (see Figure above).
7. Install an EMI metal shield over the bay area where you removed the peripheral device. The EMI shield is secured by just snapping it into place.
8. Install a filler panel in the open area of the system bezel corresponding to the bay where the media device was removed.
9. Replace the side panel and front panel, and power on the system.
10. Remove the drive serial number from the equipment log.

5

Problem Solving

- Problem Solving
- Static Precautions
- Resetting the System
- Fault Resilient Booting
- Troubleshooting Checklists
- Additional Troubleshooting Procedures
- Specific Problems and Corrective Actions
- Problems with the Network
- PCI Installation Tips
- BIOS User’s Information

Problem Solving

This chapter helps you identify and solve problems that may occur during system installation or while using your system. The first section of this chapter tells you how to reset your system in the event of problems. The next few sections provide troubleshooting checklists and procedural steps that help you isolate specific system problems. The last section includes BIOS, system, and disk status user information.

⚠ WARNING

The DC push-button on/off switch on the front panel does not turn off the system AC power. Also, +5vdc is present on the system board whenever the AC power cord is connected between the system and an AC outlet. Before doing the procedures in this manual, make sure that your system is powered off and unplug the AC power cords from the back of the chassis. Failure to disconnect power before opening your system can result in personal injury and equipment damage

⚠ CAUTION

Operating your system with the side panels removed can damage your system components. For proper cooling and airflow, always replace the side panels before powering on your system.

Static Precautions

An electrostatic discharge (ESD) can damage disk drives, option boards, and other components. You can provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground when handling system components.

Electronic devices can be easily damaged by static electricity. To prevent damage, keep them in their protective packaging when they are not installed in your system.

Resetting the System

To do this:	Press:
Soft boot reset, which clears system memory and reloads the operating system.	Ctrl+Alt+Del
Clear system memory, restart POST, and reload the operating system.	Reset button
Cold boot reset. Turn the system power off and then on. This clears system memory, restarts POST, reloads the operating system, and halts power to all peripherals.	Power off/on

Fault Resilient Booting

Fault resilient booting insures the system will not stop from a boot problem. Two sets of timers are implemented in the BMC that will automatically reset the system if the system should halt for some reason. Refer to "Fault Resilient Booting (FRB) Timer Enable Jumper" in Chapter 3.

Troubleshooting Checklists

The following subsections provide troubleshooting checklists for problems that occur at initial system startup, when you run new application software, and after the system hardware and software have been running correctly.

Initial System Startup

Incorrect installation or configuration usually causes problems that occur at initial system startup. Hardware failure is a less frequent cause. If you have problems during initial system startup, check the following:

- Are the system power cords properly connected to the system and plugged into a NEMA 5-15R outlet (100-120 Vac) or a NEMA 6-15R outlet (200-240 Vac)?
- Is AC power available at the wall outlet?
- Is the power on/off push-button switch on the front panel in the ON position (power on LED should be lit)?
- Are all cables correctly connected and secured?
- Are all the PCI/ISA option boards fully seated in their connector slots on the system board?
- Are all switch and jumper settings on the system board correct?
- Are all jumpers and switch settings on option boards and peripheral devices correct? To check these settings, see the respective appendices. If applicable, ensure that there are no conflicts; for example, two option boards sharing the same interrupt.
- Are the processors fully seated in their slots on the system board? Refer to the "Upgrades and Options" chapter for installation instructions?
- Are all DIMMs fully seated and installed correctly? Refer to the "Upgrades and Options" chapter for installation instructions?
- Are all option boards and disk drives installed correctly? Refer to the "Upgrades and Options" chapter.
- Is the system hard disk drive properly formatted or defined?
- Are all peripheral devices installed correctly?
- Is the operating system properly loaded? Refer to the operating system documentation.
- Are all drivers properly installed? For information about installing drivers, refer to your Network Operating System Configuration Guide.
- Are the configuration settings in BIOS Setup and the System Setup Utility (SSU) correct?

If the above items are all correct, but the problem reoccurs, refer to "Additional Troubleshooting Procedures" in this chapter.

Running New Application Software

Problems that occur when you run new application software are usually related to the software. Faulty equipment is much less likely, especially if other software runs correctly. If you have problems while running new application software, check the following:

- Does the system meet the minimum hardware requirements for the software? Refer to the software documentation.
- Is the software an authorized copy? Unauthorized copies often do not work. Obtain an authorized copy of the software.
- If you are running the software from a diskette, is it a good copy?
- If you are running the software from a hard disk drive, is the software correctly installed? Where all necessary procedures followed and files installed?
- If you are running the software from a CD-ROM disk is the disk scratched or dirty?
- Are the correct device drivers installed?
- Is the software correctly configured for the system?
- Are you using the software correctly?
- If other software runs correctly on the system, contact your vendor about the failing software.

If the problems persist with the software, contact the software vendor's customer service representative.

After System Has Been Running Correctly

Problems that occur after the system hardware and software have been running correctly often indicate equipment failure. However, many situations that are easy to correct can also cause such problems. If you have problems after the system has been running correctly, check the following:

- If you are running the software from a diskette or CD-ROM, try a new copy of the software.
- If you are running the software from a hard disk drive, try running it from a diskette. If the software runs correctly, there may be a problem with the copy on the hard disk. Reinstall the software on the hard disk drive and try running it again. Make sure all the necessary files are installed.
- If the problem recurs, you may need to reformat the hard disk drive. The hard disk drive, the drive controller, or the system board may be defective.
- If the problems are intermittent, there may be a loose cable, dirt in the keyboard (if keyboard input is incorrect), a marginal power supply, or other random component failures.
- If you suspect that a transient voltage spike, power outage, or brownout might have occurred, reload the software and try running it again. Symptoms of voltage spikes include a flickering video display, unexpected system reboots, and the system not responding to user commands.

> ***Note:*** Voltage spikes can corrupt or destroy data files on the drive. If you are experiencing voltage spikes on the power line, install a surge suppresser between the power outlet and the system power cord.

If the problem recurs after you have checked and corrected all of the above items, refer to “Additional Troubleshooting Procedures” in this chapter.

Additional Troubleshooting Procedures

This section provides a more detailed approach to diagnostic testing and identification of a problem and locating its source.

Use the following troubleshooting procedures to help you identify a problem. These general procedures lead you through the following:

- Preparing the system for diagnostic testing
- Monitoring POST while it is running
- Verifying proper operation of key system LEDs
- Confirming loading of the operating system.

Preparing the System for Diagnostic Testing

To prepare the system for diagnostic testing, perform the following:

> ***Note:*** Before disconnecting any peripheral cables from the system, turn off the system and any external peripheral devices. Failure to do so can cause permanent damage to the system and/or the peripheral devices.

1. Turn off the system and all external peripheral devices. Disconnect all devices from the system except the keyboard and video monitor.
2. Make sure the system power cords are plugged into a properly grounded AC outlet.
3. Make sure your video display monitor and keyboard are correctly connected to the system. Turn on the video monitor. Set its brightness and contrast controls to at least two-thirds of their maximum ranges (refer to the documentation supplied with your video display monitor).
4. If the operating system normally loads from the hard disk drive, make sure there is no diskette in drive A. Otherwise, place a diskette containing the operating system files in drive A.
5. Turn on the system. If the power indicator LED does not light, refer to “Power Light Does Not Light” found later in this chapter.

Monitoring POST

Each time you turn on the system, the Power-On Self-Test (POST) runs automatically and checks the system board, processor board, memory, keyboard, and most installed peripheral devices.

During the memory test, POST displays the amount of memory that it is able to access and test. Depending on the amount of memory, it may take several minutes to complete the memory test.

Press **F2** to enter SETUP. If you do not press **F2**, the above message remains for a few seconds and the boot process continues.

If POST finds an error, it displays an error message and, in case there is a problem with the display, it emits a series of long and short beeps. Write down any beep code emitted. This information is useful to your service representative.

Refer to the "BIOS User's Information" section in this chapter for a list of items to check for each error code and for an explanation of the error beep codes.

The POST Tests table at the end of this chapter lists keys active during POST and provides a description of errors that may occur.

The BIOS indicates errors by writing an error code to the PS/2-standard logging area in the Extended BIOS Data Area, and by displaying a message on the screen, which is sometimes preceded by the POST Error Code. The error code will also be logged to the Event Logging area.

Report any error code to your service representative.

POST Keys and Errors

Action/Message	Description
If POST Beeps Before Video Appears	Initialization failed before video initialized. Most beep code errors are fatal; initialization cannot continue. Refer to the section "BIOS User's Information" in this chapter.
If Monitor Displays Error	Note error; press **F1** to continue boot or **F2** to enter Setup. Refer to the section "BIOS User's Information" in this chapter.
To Enter Setup	Setup changes specific options, then writes to CMOS, NVRAM. Press **F2** during initialization to run Setup. If you do not press **F2**, the boot process continues.
Enter BOOT Diskette	If prompted, insert the boot diskette.

Verifying Proper Operation of Key System Indicators

As POST determines the system configuration, it tests for the presence of each mass storage device installed in the system. As each device is checked, its activity indicator should turn on briefly. Check for the following:

- Does the diskette drive activity indicator turn on briefly? If not, refer to "Diskette Drive Activity Indicator Does Not Light" in this chapter.
- If a second diskette drive is installed, does its activity indicator turn on briefly? If not, refer to "Diskette Drive Activity Indicator Does Not Light" in this chapter.
- If there is a hard disk drive or SCSI devices installed in the system, does the hard disk drive activity indicator turn on briefly? If not, refer to "Hard Disk Drive Activity Indicator Does Not Light" in this chapter.

Confirming Loading of the Operating System

Once the system boots up, the operating system prompt appears on the screen. The prompt varies according to the operating system. If the operating system prompt does not appear, refer to "Problems with Application Software" found later in this chapter.

Specific Problems and Corrective Actions

This section provides possible solutions for the following specific problems:

- Power LED does not light
- No beep or incorrect beep pattern
- No characters appear on screen
- Characters on the screen appear distorted or incorrect
- System cooling fans do not rotate
- Diskette drive activity LED does not light
- Hard disk drive activity LED does not light
- CD-ROM drive activity LED does not light
- Problems with application software
- The startup prompt “Press <F2> key if you want to run Setup” does not appear on the screen.
- The bootable CD-ROM is not detected.
- The SSU does not boot

Try the solutions in the order given. If you cannot correct the problem, contact your service representative for assistance.

Power LED Does Not Light

Check the following:

- Is the system operating normally? If so, the power LED is probably defective or the cable from the front panel to the server board is loose.
- Are there other problems with the system? If so, check the items listed under "System Cooling Fans Do Not Rotate".

If all items are correct and problems persist, contact your customer service representative.

Incorrect or No Beep Code

Check the following:

- Is the speaker enabled?
- Is the speaker cable connected to the system board?

If the system operates normally, but there was no beep, the speaker may be defective, contact your service representative for assistance.

Record the beep code emitted by POST, and see the "Messages and Beep Codes" section found later in this chapter.

No Characters Appear on Screen

Check the following:

- Is the keyboard working? Check to see if the **Num Lock** light is functioning.
- Is the video display monitor plugged in and turned on?
- Are the brightness and contrast controls on the video monitor properly adjusted?
- Are the video monitor switch settings correct?
- Is the video monitor signal cable properly installed?
- Is the onboard video controller enabled?

If you are using an option video controller board, perform the following:

1. Verify that the video controller board is fully seated in the system board connector.
2. Run the SSU to disable the onboard video controller.
3. Reboot the system for changes to take effect.

If there are still no characters on the screen after you reboot the system, contact your service representative or authorized dealer for assistance.

POST emits one long beep and two short beeps pattern to indicate a possible problem with the video display controller. If you do not receive a beep pattern and characters do not display, the video display or video controller may have failed. Contact your service representative or authorized dealer for assistance.

Characters are Distorted or Incorrect

Check the following:

- Are the brightness and contrast controls properly adjusted on the video monitor? Refer to the documentation supplied with your video monitor.
- Are the video monitor's signal and power cables properly installed?
- If the problem persists, the video monitor may be faulty or it may be the incorrect type. Contact your service representative for assistance.

System Cooling Fans Do Not Rotate

> ***Note:*** The system has a cooling fan module (containing either two or three fans) behind the hard disk drives. In addition, there are two fans one directly in front of and one directly behind the system board, including a place reserved for an optional fan directly under the rear fan, and another cooling fan that is an integral part of each power supply. There are no serviceable components inside the power supply. If the power supply is opened, the manufacturer's warranty is voided.

Check the following:

- Is AC power available at the wall outlet?
- Are the system power cords properly connected to the power supplies and the AC wall outlets?
- Have any of the fan motors stopped (use the server management subsystem to check the fan status)?
- Are the power connectors for the cooling fan module and fans connected to the system board?
- Is the front panel power on indicator lit?

If the switches and connections are correct and the power outlet is functioning, the power supply has probably failed. Contact your service representative for assistance.

Diskette Drive Activity LED Does Not Light

Check the following:

- Are the diskette drive's power and signal cables properly installed?
- Are all relevant switches and jumpers on the diskette drive set correctly?
- Is the diskette drive properly configured?
- Is the diskette drive activity light always on? If so, the signal cable may be plugged in incorrectly.

If you are using the onboard diskette controller, use Setup or the SSU to make sure that Onboard Floppy is set to Enabled. Conversely, to use an optional fixed/diskette controller, make sure that Onboard Floppy is set to **Disabled**. For information about running Setup or the SSU, refer to the "Configuring Your System" chapter.

If the problem persists, there may be a problem with the diskette drive, system board, or drive signal cable. Contact your service representative for assistance.

CD-ROM Drive Activity Light Does Not Light

Check the following:

- Is the power and signal cable to the CD-ROM drive properly installed?
- Are all relevant switches and jumpers on the drive set correctly?
- Is the drive properly configured?
- Is the onboard IDE controller enabled?

Problems with Application Software

If you have problems with application software, perform the following:

- Verify that the software is properly configured for the system. Refer to the software installation and operation documentation for instructions on setting up and using the software.
- Verify a different copy of the software to see if the problem is with the copy that you are using.
- Make sure all cables are installed correctly.
- Verify that the system board jumpers are set correctly. Refer to the "Configuring Your System" chapter for jumper settings.
- If other software runs correctly on the system, contact your vendor about the failing software.

If the problem persists, contact the software vendor's customer service representative for assistance.

Press F2 Key to Enter Setup: Prompt Does Not Display

If the prompt "Press **F2** key to run Setup" does not appear at system startup, then the prompt option has been disabled in the SSU. To enable the prompt:

- Reboot the system using your SSU diskette 1, and go into the SSU to enable the prompt.

Enable F2 Prompt by Using SSU

1. Insert your SSU diskette in the diskette drive.
2. Reboot the system by pressing **Ctrl+Alt+Del** while at the DOS operating system prompt *or* by pressing the reset switch.
3. When the DOS Startup menu appears, select 1 or 2 to enter the SSU.
4. Select Step 3, "Change Configuration Settings." If a password menu displays, enter a user or administrative password if either is enabled, or just press **ESC** to bypass this menu prompt.
5. Select the System Board.
6. Page down until you reach the Boot Subsystem Group. It is toward the end of the groups.
7. Find and select the option that says, "Display 'F2 for Setup' Message during POST."
8. Press **Enter** to display the option menu.
9. Select **Enable** and press **Enter**.
10. If you are finished editing the settings for the system board, press **Esc**. This takes you back up to the main menu, Step 3.
11. Press **Esc** again to return to the main SSU menu.
12. Select Step 4, Save Configuration. Once you select this step, the changes are immediately saved into an INF file, a CMS file, and nonvolatile memory.
13. Press **Esc** to exit the SSU. You will be prompted to reboot the system or simply exit to the command line prompt. You'll need to reboot the system to let your changes take effect, but ***first*** remove the SSU diskette drive. ***Then*** press **F10** to reboot.

You should now see the **F2** prompt displayed at bootup.

Enable F2 Prompt by Changing a Jumper and Using SSU

If you do not have an SSU diskette or CD available, you can clear CMOS memory to enable the **F2** prompt. This means you must change a jumper on the system board, run the SSU, save your changes, and change the jumper back to the default setting.

⚠ CAUTION

This procedure resets *all* to default settings: Clearing CMOS memory resets *all* SSU and Setup settings to their defaults, not just the CMOS CLR setting. Before proceeding, check that you have a backup paper copy of configuration. Referring to the worksheets could make your reconfiguration task easier.

1. Observe the safety and ESD precautions stated at the beginning of this chapter.
2. Turn off all connected peripherals, turn off system power, and disconnect the AC power cord.
3. Remove the side cover. Refer to the "Upgrades and Options" chapter for information on removing the side cover. You do not need to remove the system board from the chassis, and you probably do not need to remove any add-in boards.
4. Locate the CMOS configuration jumper at the edge of the system board toward the front of the system. Refer to the "Configuring Your System" chapter for information on the location of the CMOS jumper.
5. Move the CMOS CLR jumper from the CMOS Protect setting on pins 1 and 2 to the CMOS Clear setting on pins 2 and 3.
6. Reinstall the side cover for your safety, and connect the power cord to the system.
7. Power on the system. POST starts and halts displaying an "Invalid CMOS Settings" error.
8. Turn off the system, and disconnect the power cords.
9. Again remove the side cover.
10. Move the CMOS CLR jumper from pins 2 and 3 back to pins 1 and 2 (the Protect CMOS memory position).
11. Reinstall the side cover, and connect the power cords.
12. Turn the system on. Run BIOS Setup (F2) to verify the correct settings. Refer to Chapter 3 for information on running BIOS Setup.

Bootable CD-ROM Is Not Detected

Check the following:

- Is the BIOS set to allow the CD-ROM to be the first bootable device? Check your BIOS Setup (F2) configuration.

Problems with the Network

The server hangs when the drivers are loaded:

- Change the PCI BIOS interrupt settings. Try the "PCI Installation Tips" below.

Diagnostics pass, but the connection fails:

- Make sure the network cable is securely attached.
- Make sure you specify the correct frame type in your NET.CFG file.

The Link LED doesn't light:

- Make sure you have loaded the network drivers.
- Check all cable connections.
- Try another port on the hub.
- Make sure you have the correct type of cable between the adapter and the hub. Some hubs require a crossover cable while others require a straight-through cable (for more information on crossover cabling, see your hub documentation).

The Activity LED doesn't light:

- Make sure you've loaded the correct network drivers.
- Network may be idle. Try accessing a server.

The controller stopped working when an add-in adapter was installed:

- Make sure the cable is connected to the port from the onboard network controller.
- Make sure your PCI BIOS is current. Try the "PCI Installation Tips" below.
- Make sure the other adapter supports shared interrupts. Also, make sure your operating system supports shared interrupts; OS/2 does not.
- Try reseating the add-in adapter.

The add-in adapter stopped working without apparent cause.

- Try reseating the adapter first; then try a different slot if necessary.
- The network driver files may be corrupt or deleted. Delete and then reinstall the drivers.
- Run the diagnostics.

PCI Installation Tips

Some common PCI tips are listed here.

- Reserve interrupts (IRQs) and/or memory addresses specifically for ISA adapters. This prevents PCI cards from trying to use the same settings ISA cards are using. Use the SSU to keep track of ISA adapter resources.
- Certain drivers may require interrupts that are not shared with other PCI drivers. The SSU can be used to adjust the interrupt numbers for PCI devices. For certain drivers, it may be necessary to alter settings so that interrupts are not shared.

BIOS User's Information

This section describes the various screen messages and beep codes of the system BIOS. The BIOS indicates errors by writing an error code to the PS/2-standard logging area in the Extended BIOS Data Area (EBDA), and by displaying a message on the screen, which is sometimes preceded by the POST Error Code. The error code will also be logged to the Event Logging area.

> ***Note:*** Your system error log will be lost, if your system ac power source is off or disconnected.

Error and Status Messages

"BIOS Messages" table is an alphabetic list of error and status messages that BIOS generates and an explanation of each message. Many of the messages refer to the built in Setup program. For more information about Setup, refer to the "Configuring Your System" chapter.

BIOS Messages

Message	Description
nnnn Cache SRAM Passed	Where *nnnn* is the amount of system cache in kilobytes successfully tested.
Diskette drive A error or Diskette drive B error	Diskette Drive is present but fails the BIOS POST diskette tests. Check to see that the drive is defined with the proper diskette type in Setup and that the diskette drive is correctly attached.
Entering SETUP ...	The Setup program is starting.
Extended RAM Failed at offset: *nnnn**	Extended memory is not working or is not properly configured at offset *nnnn*.
nnnn Extended RAM passed	Where *nnnn* is the amount of RAM in kilobytes successfully tested.
Failing Bits: *nnnn**	The hex number *nnnn* is a map of the bits at the RAM address (in System, Extended, or Shadow memory) which failed the memory test. Each 1 (one) in the map indicates a failed bit.
Fixed Disk 0 Failure or Fixed Disk 1 Failure or Fixed Disk Controller Failure*	Fixed disk is not working or not properly configured. Check to see if the fixed disk is attached properly. Run Setup to be sure the fixed disk type is correctly identified.
Incorrect Drive A type - run SETUP or Incorrect Drive B type - run SETUP	Type of floppy drive is not correctly identified in Setup.
Invalid NVRAM media type*	Problem with NVRAM (CMOS) access.
Keyboard controller error*	The keyboard controller test failed. You may have to replace the keyboard or controller.
Keyboard error *nn*	The keyboard is not working. BIOS discovered a stuck key and displays the scan code *nn* for the stuck key.
Monitor type does not match CMOS - Run SETUP	Monitor type is not correctly identified in Setup.
Operating system not found	The operating system cannot be located on either drive A: or drive C:. Enter Setup and see if the fixed disk and floppy are properly identified.

*If your system displays this message, write down the message and notify your customer representative. If your system fails after you made changes in the BIOS Setup menus, you may be able to correct the problem by entering Setup and restoring the original values.

BIOS Messages (Continued)

Message	Description
Parity Check 1 *nnnn** or Parity Check 2 *nnnn**	A parity error was found in the system bus (Parity Check 1) or the I/O bus (Parity Check 2). BIOS attempts to locate and display the address on the screen. If it cannot locate the address, it displays.
Press <F1> to resume, <F2> to Setup	Displayed after any recoverable error message.
Press <F2> to enter SETUP	Optional message displayed during POST. Can be turned off in Setup.
Previous boot incomplete - Default configuration used	Previous POST did not successfully complete. POST loads default values and offers to run Setup. If the failure was caused by incorrect values and they are not corrected, the next boot will likely fail. On systems with control of wait states, improper Setup settings can also terminate POST and cause this error on the next boot. Run Setup and verify that the wait-state configuration is correct. This error is cleared the next time the system is booted.
Real time clock error*	Real time clock fails BIOS test. May require board repair.
Shadow Ram Failed at offset: *nnnn**	Shadow RAM failed at offset *nnnn* of the 64K block at which the error was detected.
nnnn Shadow RAM Passed	Where *nnnn* is the amount of shadow RAM in kilobytes successfully tested.
System battery is dead - Replace and run SETUP	The CMOS clock battery indicator shows the battery is dead. Replace the battery and run Setup to reconfigure the system.
System BIOS shadowed	The system BIOS is copied to shadow RAM.
System cache error - Cache disabled*	The RAM cache failed the BIOS test and BIOS has disabled the cache.
System CMOS checksum bad - run SETUP	The system CMOS has been corrupted or incorrectly modified, perhaps by an application program that changes data stored in CMOS. Run Setup and reconfigure the system either by getting the default values or making your own selections.
System RAM failed at offset: *nnnn**	The system RAM failed at offset *nnnn* of the 64K block at which the error was detected.
nnnn System RAM Passed	Where *nnnn* is the amount of system RAM in kilobytes successfully tested.

BIOS Messages (Continued)

Message	Description
System timer error*	The timer test failed. Requires repair of the system board.
UMB upper limit segment address: *nnnn*	Displays the address *nnnn* of the upper limit of the Upper Memory Blocks, indicating released segments of the BIOS, which may be reclaimed by a virtual memory manager.
Video BIOS shadowed	The video BIOS is successfully copied to shadow RAM.

*If your system displays this message, write down the message and notify your customer representative. If your system fails after you made changes in the BIOS Setup menus, you may be able to correct the problem by entering Setup and restoring the original values.

POST Error Codes and Messages

Whenever a recoverable error occurs during POST, BIOS displays a message on the video display screen and causes the speaker to beep as the message appears. The "POST Error Codes and Messages" table is a list of the error codes and messages written at the start of each POST test.

POST Error Codes and Messages

Code	Error message	Pause on Error
0162	BIOS unable to apply BIOS update to processor 1	Yes
0163	BIOS unable to apply BIOS update to processor 2	Yes
0164	BIOS does not support current stepping for processor 1	Yes
0165	BIOS does not support current stepping for processor 2	Yes
0200	Failure Fixed Disk	No
0210	Stuck Key	No
0211	Keyboard error	No
0212	Keyboard Controller Failed	Yes
0213	Keyboard locked - Unlock key switch	Yes
0220	Monitor type does not match CMOS - Run SETUP	No
0230	System RAM Failed at offset:	No
0231	Shadow Ram Failed at offset:	No
0232	Extended RAM Failed at offset:	No
0250	System battery is dead - Replace and run SETUP	Yes
0251	System CMOS checksum bad - Default configuration used	Yes
0260	System timer error	No
0270	Real time clock error	No
0297	ECC Memory error in base (extended) memory test in Bank xx	Yes
02B2	Incorrect Drive A type - run SETUP	No
02B3	Incorrect Drive B type - run SETUP	No
02D0	System cache error - Cache disabled	No
02F5	DMA Test Failed	Yes
02F6	Software NMI Failed	No
0401	Invalid System Configuration Data - run configuration utility	No
None	System Configuration Data Read Error	No
0403	Resource Conflict	No
0404	Resource Conflict	No
0405	Expansion ROM not initialized	No

Post Error Codes and messages (Continued)

Code	Error Message	Pause on Error
0406	Warning: IRQ not configured	No
0504	Resource Conflict	Error
0505	Expansion ROM not initialized	No
0506	Warning: IRQ not configured	No
0601	Device configuration changed	No
0602	Configuration error - device disabled	No
8100	Processor 0 failed BIST	Yes
8101	Processor 1 failed BIST	Yes
8104	Processor 0 Internal Error (IERR) failure	Yes
8105	Processor 1 Internal Error (IERR) failure	Yes
8106	Processor 0 Thermal Trip failure	Yes
8107	Processor 1 Thermal Trip failure	Yes
8108	Watchdog Timer failed on last boot, BSP switched.	Yes
810A	Processor 1 failed initialization on last boot.	Yes
810B	Processor 0 failed initialization on last boot.	Yes
810C	Processor 0 disabled, system in Uni-processor mode	Yes
810D	Processor 1 disabled, system in Uni-processor mode	Yes
810E	Processor 0 failed FRB Level 3 timer	Yes
810F	Processor 1 failed FRB Level 3 timer	Yes
8110	Server Management Interface failed to function	Yes
8120	IOP sub-system is not functional	Yes
8150	NVRAM Cleared by Jumper	Yes
8151	NVRAM Checksum Error, NVRAM cleared	Yes
8152	NVRAM Data Invalid, NVRAM cleared	Yes

A

System Cabling

- System Cabling
- Before You Begin
- Static Precautions
- Standard Configuration

System Cabling

This appendix contains information and procedures on the standard cabling configuration used in your system.

Before You Begin

⚠ WARNING

The DC push-button on/off switch on the front panel does not turn off the system AC power. Also, +5vdc is present on the system board whenever the AC power cords are connected between the system and an AC outlet. Before doing the procedures in this manual, make sure that your system is powered off and unplug the AC power cords from the back of the chassis. Failure to disconnect power before opening your system can result in personal injury and equipment damage.

Static Precautions

An electrostatic discharge (ESD) can damage disk drives, option boards, and other components. You can provide ESD protection by wearing an antistatic wrist strap attached to chassis ground when handling system components.

Electronic devices can be easily damaged by static electricity. To prevent damage, keep them in their protective packaging when they are not installed in your system.

Standard Configuration

Your system is cabled using a dual channel on-board IDE Controller and dual on-board Adaptec AIC-7896 SCSI Controller.

The on-board IDE controller supports the standard internally mounted CD-ROM as its first (master) device and an optional internally mounted IDE tape drive as its second (slave) device.

The AIC-7896 contains one independent Ultra2 (LVD) wide and one Ultra wide SCSI interface that share a single PCI bus master controller. As implemented on the system board controller A attaches to an Ultra2 SCSI backplane that supports up to seven Ultra-2 SCA drives. Controller B may be used to support SCSI devices in the removable media bays.

A 3.5-inch diskette drive is also installed in all systems and interfaces separately to the system board.

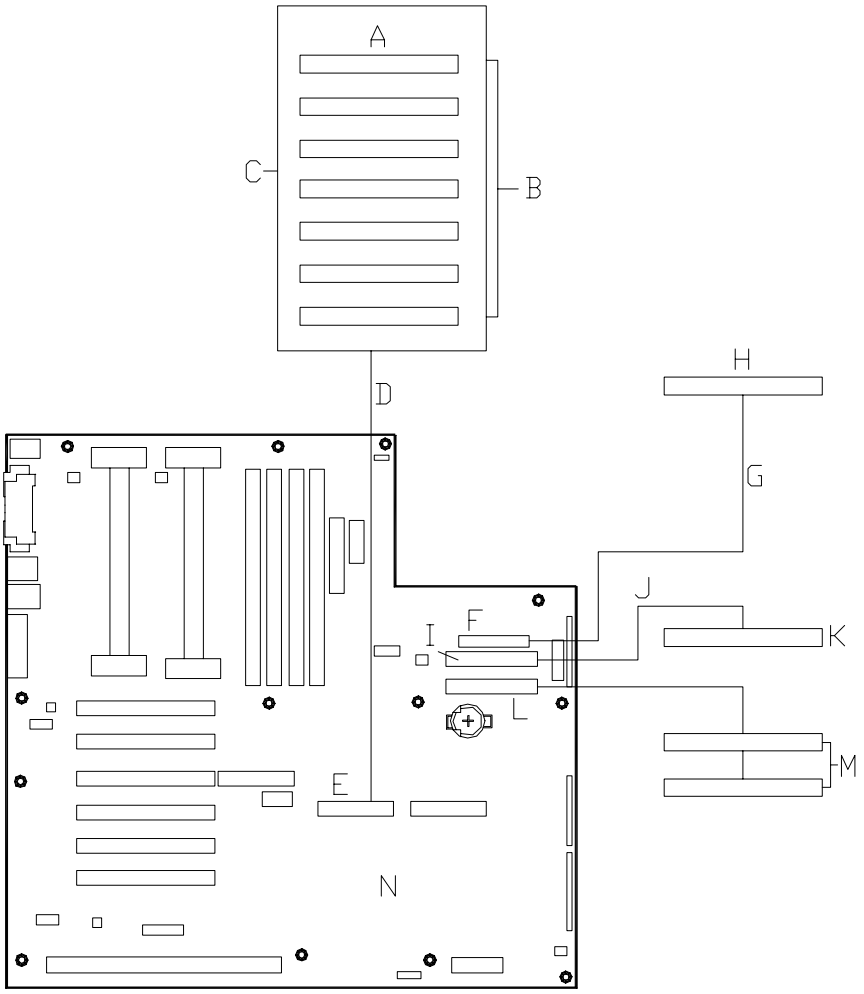
Referring to the Figure below, a 68-pin wide SCSI interface cable (D) is connected to the SCSI connector (E) in the lower middle of the system board. This cable connects to the rear of the hard disk drive's SCSI backplane (C).

The IDE interface cable (J) is connected to the IDE connector (I) towards the right edge of the system board. This cable connects to the rear of the internally mounted CD-ROM drive (K).

When adding or removing IDE devices, consider the following:

> ***Note:*** Only one IDE cable is supplied with the system.

- The system board supports a primary and secondary IDE channel connector. Each of these supports two devices, for a total of four IDE devices.
- A first (master) device and a second (slave) device are supported on both the primary and secondary IDE channel connector.
- The device configuration, master versus slave, is determined by jumpers on the devices. Cable Sense (CS) device configuration is not supported.
- If only one device is on a channel connector it must be set as the master device.



Standard System Cable Configuration

A. Seven SCSI disk drive bays

B. SCSI Hard disk drives

C. SCSI Backplane

D. Wide SCSI Interface cable

E. Wide SCSI connector (68 pin)

F. Diskette drive connector

G. Diskette interface cable

H. Diskette drive

I. Primary IDE connector

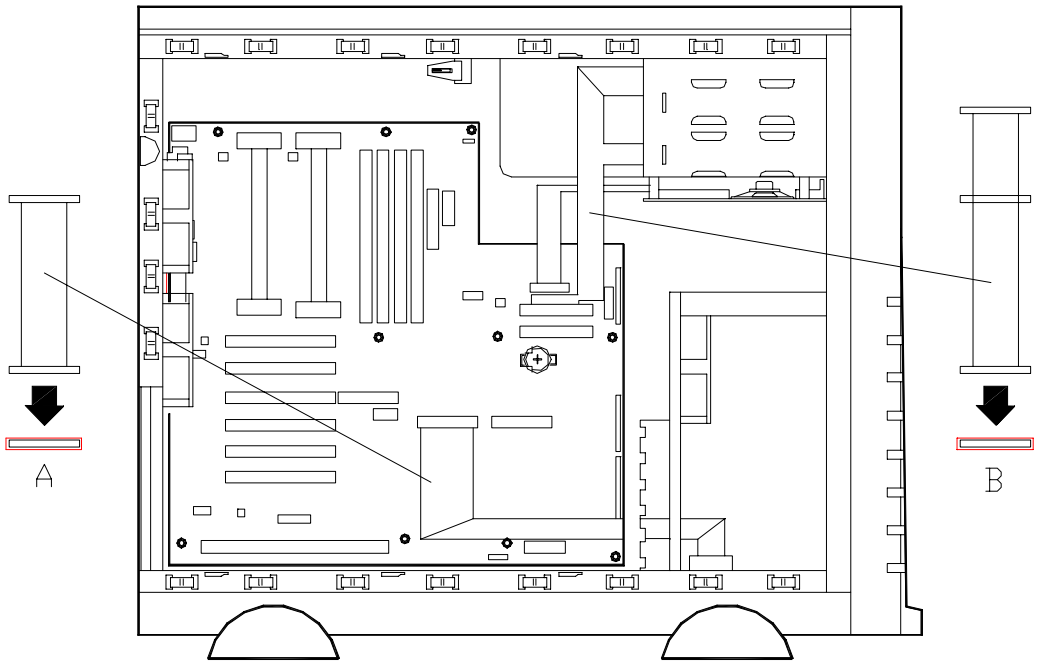
J. IDE Interface Cable

K. IDE CD-ROM Drive

L. Secondary IDE connector

M. Optional IDE removable media devices (cable not supplied)

N. System Board



Standard System Cable Routing

A. Ultra2/LVD SCSI cable (68 pins)

B. IDE cable (40 pins)

B

System Setup Utility

- System Setup Utility (SSU)
- Creating SSU Diskettes
- Running the SSU
- Exiting the SSU

System Setup Utility (SSU)

The System Setup Utility (SSU) is a DOS-based utility that supports extended system configuration operations for onboard resources and add-in boards. It also allows you to view the system event log and to set system boot and security options. Use the SSU when you need to:

- Add and remove ISA Legacy boards affecting the assignment of resources (ports, memory, IRQs, DMA)
- Modify the server's boot device order or security settings
- Change the server configuration resource settings
- Save the server configuration
- View or clear the system event log.

If you install or remove an ISA Legacy add-in board, you must run the SSU to reconfigure the server. Running the SSU is optional for PCI and Plug and Play ISA add-in boards.

The SSU is PCI-aware, and it complies with the ISA Plug and Play specifications. The SSU works with any compliant configuration (.CFG) file supplied by the peripheral device manufacturer.

The I/O baseboard includes a .CFG file. The .CFG file describes the characteristics of the board and the system resources that it requires. The configuration registers on PCI and ISA Plug and Play add-in boards contain the same type of information that is in a .CFG file. Some ISA boards also include a .CFG file.

The SSU uses the information provided by the .CFG files, configuration registers, NVRAM, and the information that you enter, to specify a system configuration. The SSU writes the configuration information to NVRAM memory.

The SSU stores configuration values in NVRAM memory. These values take effect when you boot the server. POST checks the values against the actual hardware configuration; if they do not agree, POST generates an error message. You must then run the SSU to specify the correct configuration before the server boots up.

Creating SSU Diskettes

The SSU is run from DOS-bootable diskettes. Before you can run the SSU from diskettes, you must copy the SSU from the CD-ROM to a diskette.

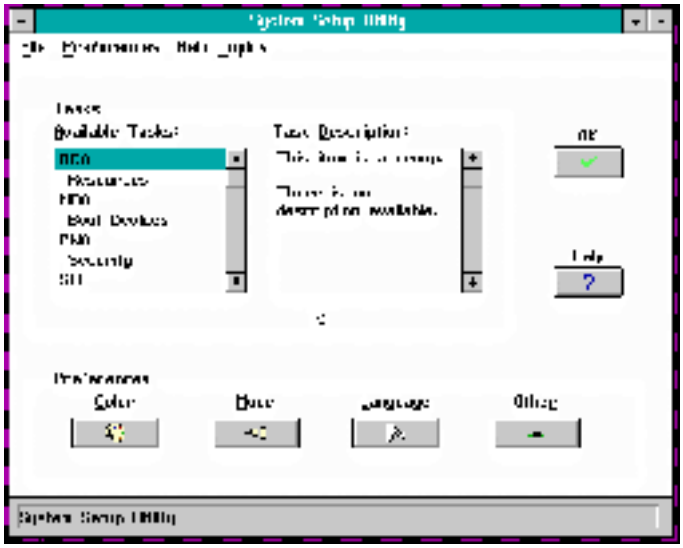
If your diskette drive is disabled, or improperly configured, you must use the FLASH-resident BIOS Setup Utility (F2) to enable it so that you can use the SSU. If necessary, you can disable the drive after you exit the SSU. Information entered using the SSU overrides information entered using Setup.

1. Power on the system.
2. If the diskette drive is disabled, enable it using the BIOS Setup, explained later in this chapter Utility and ensure that it is user accessible. Specify the correct type of diskette drive.
3. Using the CD-ROM, create the SSU diskette.

Running the SSU

The SSU consists of a collection of task oriented modules plugged into a common framework called the Application Framework (AF). The Application Framework provides a launching point for individual tasks and a location for setting customization information. For full functionality the SSU requires the availability of the AF.INI, AF.HLP, plus any .ADN files and their associated .HLP and .INI files.

1. Turn on your video monitor and your system.
2. There are two ways to start the SSU:
   - **After creating a set of three SSU diskettes from the CD:** Insert the SSU diskette in drive A, and reboot your server from the diskette.
   - **From diskette after installing your operating system:** Insert the SSU diskette in Drive A. At the MS-DOS prompt, type **a:** and press **Enter** to change to drive A. Type **SSU** and press **Enter**.
3. Follow the system prompts to load the SSU. When the SSU title appears on the screen, press **Enter** to continue.
4. When the main window of the SSU displays, you can customize the user interface before continuing.



System Setup Utility Main Menu Window

Customizing the SSU

The SSU lets you customize the user interface according to your preferences. The AF sets these preferences and saves them in the AF.INI file so that they take effect the next time you start the SSU. There are three user-customizable settings:

- **Color—**this button lets you change the default colors associated with different items on the screen with predefined color combinations. The color changes are instantaneous.
- **Mode—**this button lets you set the desired expertise level.

  — novice

  — intermediate

  — expert

The expertise level determines which tasks are visible in the Available Tasks section and what actions each task perform. For a new mode setting to take effect, the user must exit the SSU and restart it.

- **Language—**this button lets you change the strings in the SSU to strings of the appropriate language. For a new language setting to take effect, you must exit the SSU and restart it.
- **Other—**this button lets you enable or disable the status bar located at the bottom of the SSU menu displays.

There are three ways to change the interface default values:

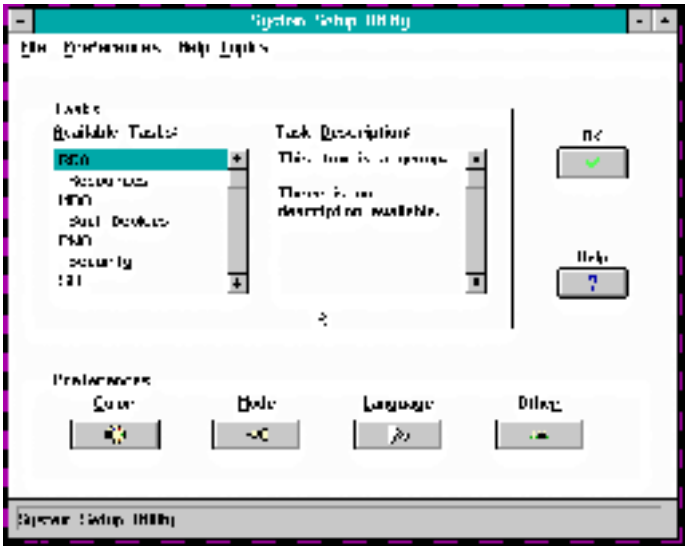
- Use the mouse to click on the proper button in the Preferences section of the SSU Main window.
- Use the tab and arrow keys to highlight the desired button, and press the spacebar or **Enter**.
- Access the menu bar with the mouse or hot keys (Alt + underlined letter).

Launching a Task

It is possible to have many tasks open at the same time, although some tasks may require complete control to avoid possible conflicts. The tasks achieve complete control by keeping the task as the center of operation until the user closes the task window.

There are three ways to launch a task:

- In the SSU Main window, double-click on the task name under Available Tasks to display the main window for the selected task.
- Highlight the task name, and click on OK.
- Use the tab and arrow keys to highlight the task name, and press the spacebar.



System Setup Utility Main Menu Window

Resource Configuration Add-in (RCA) Window

The RCA provides three major functions:

- Creates representations of devices that cannot be discovered by the system (ISA cards)
- Modifies the contents of the system by adding and removing devices
- Modifies the resources used by devices.

You can use the RCA window to define an ISA card or add an ISA card by clicking on the appropriate button. Removing an ISA card requires that the card be highlighted in the Devices section of the screen before clicking on the button.

1. From the SSU main window, launch the RCA by selecting the "Resources" task under the RCA heading in the task box. Click OK.
2. When the RCA window appears, it displays messages similar to the following:

   Baseboard: System Board

   PCI Card: Bus 00 dev 00 –– Host Processor Bridge

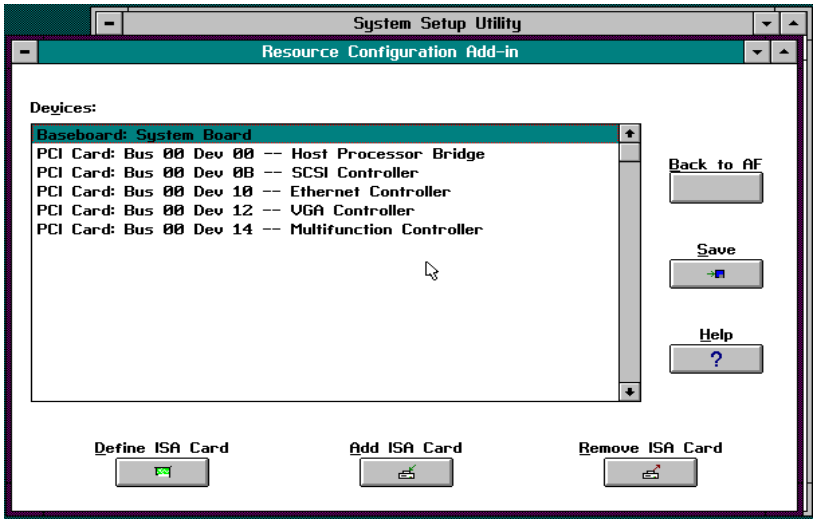
   PCI Card: Bus 00 dev 0D –- Multifunction Controller

   PCI Card: Bus 00 dev 0F –- Ethernet Controller

   PCI Card: Bus 00 dev 12 –– Multifunction Controller

   PCI Card: Bus 00 dev 14 –– VGA Controller

3. To configure a device, select its name in the Devices section of the RCA window, and press the spacebar, press ENTER, or double-click on its name.
4. Make configuration changes and click on OK to return to the RCA window. Repeat Steps 3 and 4 to configure additional devices.
5. Save all the changes made by clicking on the Save button. Saving writes your current configuration to nonvolatile storage where it will be available to the system after every reboot.
6. Close the RCA window and return to the Main Menu by clicking on the Close button.


System Setup Utility
Resource Configuration Add-in
Devices:
Baseboard: System Board
PCI Card: Bus 00 Dev 00 -- Host Processor Bridge
PCI Card: Bus 00 Dev 0B -- SCSI Controller
PCI Card: Bus 00 Dev 10 -- Ethernet Controller
PCI Card: Bus 00 Dev 12 -- VGA Controller
PCI Card: Bus 00 Dev 14 -- Multifunction Controller
Back to AF
Save
Help
?
Define ISA Card
Add ISA Card
Remove ISA Card

RCA Window

Defining an ISA Card

An ISA card usually comes with a vendor-created .CFG file that specifies the resources the card requires to function properly. If the .CFG file is unavailable, you must manually create it or define the card through the SSU. Defining an ISA card consists of specifying the name of the card and the resources it consumes. This allows the RCA to consider the ISA card resource requirements when the RCA tries to resolve conflicts. The information is also used by the system BIOS to configure the hardware when the system is booted.

1. From the SSU main window, launch the RCA by selecting the “Resources” task under the RCA heading in the task box.
2. When the RCA window appears, click on the “Define ISA Card” button.
3. To add or remove ISA card resources, click on the appropriate resource buttons, select the desired value, and click on Add or Remove.
4. After you complete the necessary information, click on Save.
5. To edit a card, click on Load to retrieve the card information. After making changes, click on Save.
6. To create a card, click on New.
7. To remove a current definition of a card, click on Delete Board.
8. To return to the RCA Menu, click on Close.

Adding and Removing ISA Cards

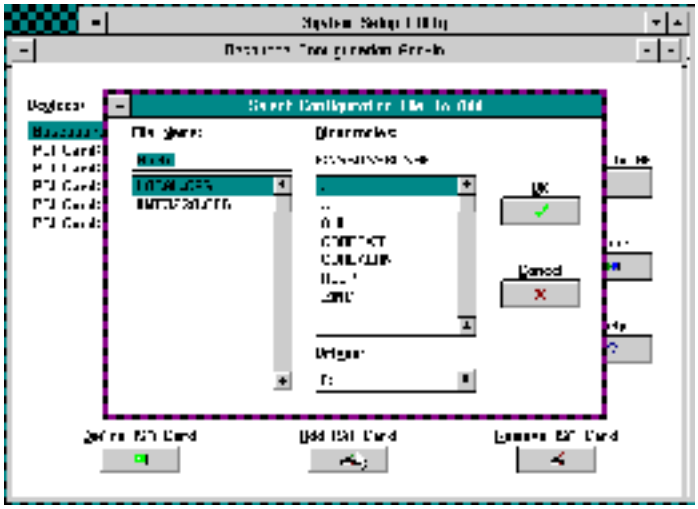
Adding and removing cards through the RCA provides a way for the RCA to run its conflict detection algorithms on the resources requested by the cards. This alerts you to any possible problems with that particular card in the current configuration.

To add an ISA card:

1. Click on Add ISA Card in the RCA window.
2. Specify the directory for the .CFG file.
3. Select the file and click on Ok.

To remove an ISA card:

1. Select a valid ISA card in the Devices section of the RCA window.
2. Click on Remove ISA Card.



Adding and Removing ISA Cards Window

Modifying Resources

Modifying the resources of a device may be necessary to accommodate certain operating systems, applications, and drivers. It may also be necessary to modify resources to resolve a conflict.

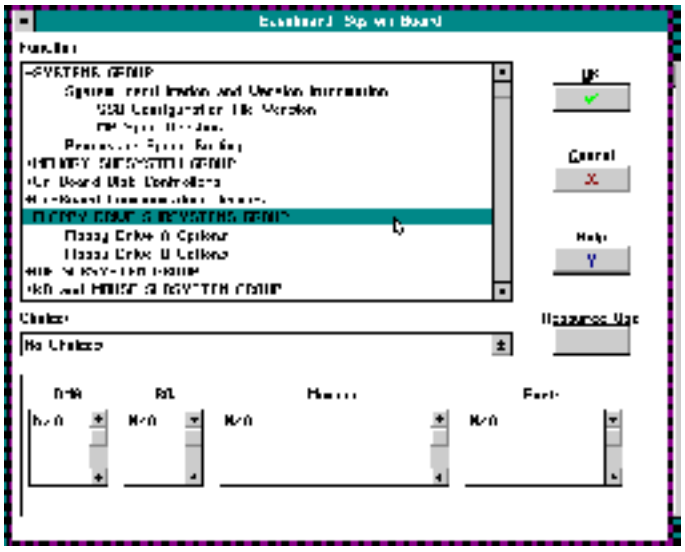
To modify the resources associated with a device:

1. Highlight the device in the Devices section of the RCA window.
2. Press the spacebar, press Enter, or double-click on the entry.

The functions of the selected device along with possible choices and the resources associated with those choices displays.

To make a modification:

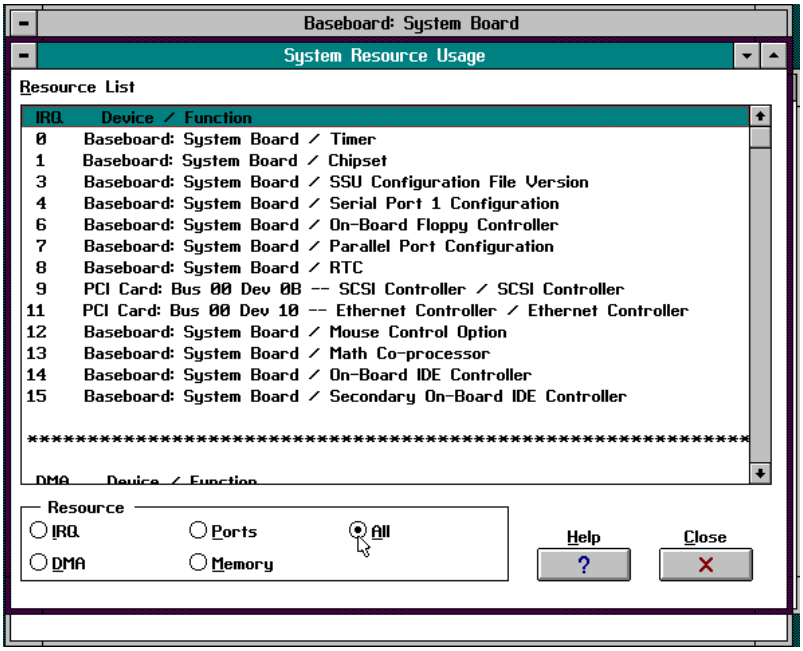
1. Highlight the function in the Configuration window.
2. Press the spacebar, press Enter, or double-click on the entry (this updates the Choice and resource lists).
3. Press the tab key to get to the Choice list, and press **Enter**.
4. Use the arrow keys to select a proper choice, and press **Enter** again.
5. If the choice allows multiple possible values for a particular resource, use the hot key to select a resource, and press the spacebar or double click on the resource.
6. Select the desired resource, and click on Ok.



Configuration Window

System Resource Usage

Clicking on the Resource Use button in the Configuration window displays the System Resource Usage window. This window shows what resources each device is consuming. This information is useful for choosing resources if a conflict occurs. Devices can be organized according to the resources the user wants to examine using the options in the Resource section of the screen. The resource information can also be written to a plain text file through this window.


Baseboard: System Board
System Resource Usage
Resource List
IRQ Device / Function
0 Baseboard: System Board / Timer
1 Baseboard: System Board / Chipset
3 Baseboard: System Board / SSU Configuration File Version
4 Baseboard: System Board / Serial Port 1 Configuration
6 Baseboard: System Board / On-Board Floppy Controller
7 Baseboard: System Board / Parallel Port Configuration
8 Baseboard: System Board / RTC
9 PCI Card: Bus 00 Dev 0B -- SCSI Controller / SCSI Controller
11 PCI Card: Bus 00 Dev 10 -- Ethernet Controller / Ethernet Controller
12 Baseboard: System Board / Mouse Control Option
13 Baseboard: System Board / Math Co-processor
14 Baseboard: System Board / On-Board IDE Controller
15 Baseboard: System Board / Secondary On-Board IDE Controller
Resource
IRQ
Ports
All
DMA
Memory
Help
Close

System Resource Usage Window

Multiboot Add-in (MBA) Window

The MBA lets you set the system boot priority. The boot priority is the order the BIOS uses to boot the operating system from various devices in your system.

To set the boot priority of your system:

1. From the SSU Main Menu, launch the MBA by selecting the "Boot Devices" task under the MBA heading in the task box. Click OK.
2. When the MBA window displays, the "Boot Device Priority" window lists the current boot priority order. The "Hard Drives" window lists the hard disk drive(s) in your system. During bootup, BIOS searches the list of device types shown in the "Boot Device Priority" list, starting with the first device on the list. When BIOS gets to the Hard Drives, the BIOS tries each device shown in the "Hard Drives" list, starting at the top of the list.
3. To change the priority of an entry in either list, select the entry and click on the "Move UP" or "Move Down" buttons.
4. Click on the Save button to save the boot priority.
5. Click on the Close button to return to the Main Menu.

Password Administration (PWA) Window

The PWA configures administrator and user passwords and other security options.

1. From the SSU Main Menu, launch the PWA by selecting the "Security" task under the PWA heading in the task box. Click OK. The Security window displays.
2. Select the Administrator and User Password buttons to change passwords.
   - To Set the User Password
     - — Click on the user password button.
     - — Enter the password in the first field.
     - — Confirm the password by entering it again in the second field.
   - To Change or Clear the User Password
     - — Click on the User password button.
     - — Enter the old password in the first field.
     - — Enter the new password in the second field (or leave blank to clear).
     - — Confirm the password by entering it again in the second field (or leave blank to clear).
   - To Set the Administrator Password
     - — Click on the Administrator password button.
     - — Enter the password in the first field.
     - — Confirm the password by entering it again in the second field.
   - To Change or Clear the Administrator Password
     - — Click on the Administrator password button.
     - — Enter the old password in the first field.
     - — Enter the new password in the second field (or leave blank to clear).
     - — Confirm the password by entering it again in the second field (or leave blank to clear).

3. Select the Options button to enable or disable security options. For an explanation of the configurable security options, press the Help button.

   The other security options are as follows:

   - **Hot Key** - Set a key sequence that, when pressed, will drop the server into secure mode.
   - **Lock-Out Timer** - Set an interval that, if no activity takes place during it, will drop the server into secure mode.
   - **Secure Boot Mode** - Force the server to boot directly into secure mode.
   - **Video Blanking** - Turn off the video when the server is in secure mode.
   - **Floppy Write** - Control access to the diskette drive while the server is in secure mode.
   - **Reset/Power Switch Locking** - Control the power and reset buttons while the server is in secure mode.

4. Click on the Save button to save the security option changes.
5. Click on the Close button to return to the Security menu.
6. Click on the Close button to return to the Main menu.

System Event Log (SEL) Window

Clicking on the SEL Manager brings up the Server Event Log (SEL) viewer. You can load and view the current SEL data stored in the BMC, save the currently loaded SEL data to a file, view previously saved SEL data, or clear the SEL.

The SEL displays information on the events stored in the system log area. The information stored includes the name of the event, the date and time the event occurred and data pertinent to the event. Event data may include POST error codes that reflect hardware errors or software conflicts within the system.

> ***Note:*** Refer to Chapter 5, "Problem Solving" for definitions on all POST error codes

1. From the SSU Main Menu, launch the SEL by selecting the "SEL Viewer Add-in" task under the SEL heading in the task box. Click OK. The SEL Viewer Add-in window (Event Log) displays.
2. The following screen choices are available:

Screen Choice	Options
File Menu	**Load SEL:** View data from a previously saved SEL file.
	Save SEL: Save the currently loaded SEL data to a file.
	Clear SEL: Clears the SEL data from the BMC.
	Exit: Quits the SEL Viewer.
View Menu	**SEL Info:** Displays information about the SEL. These fields are display only.
	All Events: Displays the current SEL data from the BMC.
	By Sensor: Brings up a pop-up menu that allows you to view only the data from a certain sensor type.
	By Event: Brings up a pop-up menu that allows you to view only the data from a certain event type.
Settings menu	**Display HEX/Verbose:** Toggles between the Hex/interpreted mode of displaying the SEL records.
	Output Text/Binary: Determines whether SEL data will be saved to the file (as under File - Save) in binary format or verbose format.
Help	**About**: Displays the SEL Viewer version information.

Field Replaceable Unit (FRU) Window

Clicking on the FRU Manager task brings up the Field Replaceable Unit (FRU) viewer. You can load and view the current FRU data stored in the BMC, save the currently loaded FRU data to a file, view previously saved FRU data. The FRU Viewer has the following menus:

1. From the FRU Main Menu, launch the FRU by selecting the "FRU Viewer Add-in" task under the FRU heading in the task box. Click OK. The FRU Viewer Add-in window (Event Log) displays.
2. The following screen choices are available:

Screen Choice	Options
File Menu	**Load FRU:** View data from a previously saved FRU file. **Save FRU:** Save the currently loaded FRU data to a file. **Clear FRU:** Clears the FRU data from the BMC. **Exit:** Quits the FRU Viewer.
View Menu	**FRU Info:** Displays information about the FRU. These fields are display only. **All Events:** Displays the current FRU data from the BMC. **By Sensor:** Brings up a pop-up menu that allows you to view only the data from a certain sensor type. **By Event:** Brings up a pop-up menu that allows you to view only the data from a certain event type.
Settings menu	**Display HEX/Verbose:** Toggles between the Hex/interpreted mode of displaying the FRU records. **Output Text/Binary:** Determines whether FRU data will be saved to the file (as under File - Save) in binary format or verbose format.
Help	**About**: Displays the FRU Viewer version information.

Sensor Data Record (SDR) Window

Clicking on the SDR Manager task brings up the Sensor Data Record (SDR) viewer. You can load and view the current SDR data stored in the BMC, save the currently loaded SDR data to a file, view previously saved SDR data. The SDR Viewer has the following menus:

1. From the SDR Main Menu, launch the SDR by selecting the "SDR Viewer Add-in" task under the SDR heading in the task box. Click OK. The SDR Viewer Add-in window (Event Log) displays.
2. The following screen choices are available:

Screen Choice	Options
File Menu	**Load SDR:** View data from a previously saved SDR file. **Save SDR:** Save the currently loaded SDR data to a file. **Clear SDR:** Clears the SDR data from the BMC. **Exit:** Quits the SDR Viewer.
View Menu	**SDR Info:** Displays information about the SDR. These fields are display only. **All Events:** Displays the current SDR data from the BMC. **By Sensor:** Brings up a pop-up menu that allows you to view only the data from a certain sensor type. **By Event:** Brings up a pop-up menu that allows you to view only the data from a certain event type.
Settings menu	**Display HEX/Verbose:** Toggles between the Hex/interpreted mode of displaying the SDR records. **Output Text/Binary:** Determines whether SDR data will be saved to the file (as under File - Save) in binary format or verbose format.
Help	**About**: Displays the SDR Viewer version information.

Exiting the SSU

Exiting the SSU causes all windows to close.

1. Exit the SSU by opening the menu bar item File in the SSU Main window.
2. Click on Exit or Highlight Exit, and press **Enter**.

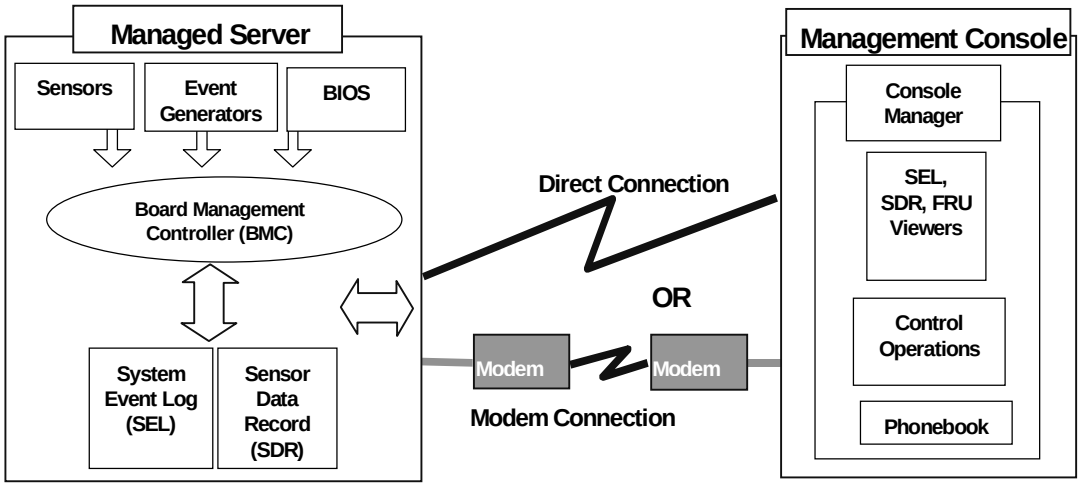
C

Emergency Management Port

- Emergency Management Port
- How the EMP Works
- EMP Requirements and Configurations
- Setting Up the Server for the EMP
- Main EMP Console Window
- Phonebook
- Management Plug-ins

Emergency Management Port

The Emergency Management Port (EMP) allows remote server management via a modem or direct connection. The COM2 port on your server provides an interface to Console Manager software located in a second system.



Emergency Management Port Configuration

The following server operations are available from the Console Manager:

- Connecting to remote servers
- Powering the server ON or OFF
- Resetting the server
- SEL viewer
- SDR viewer
- FRU viewer

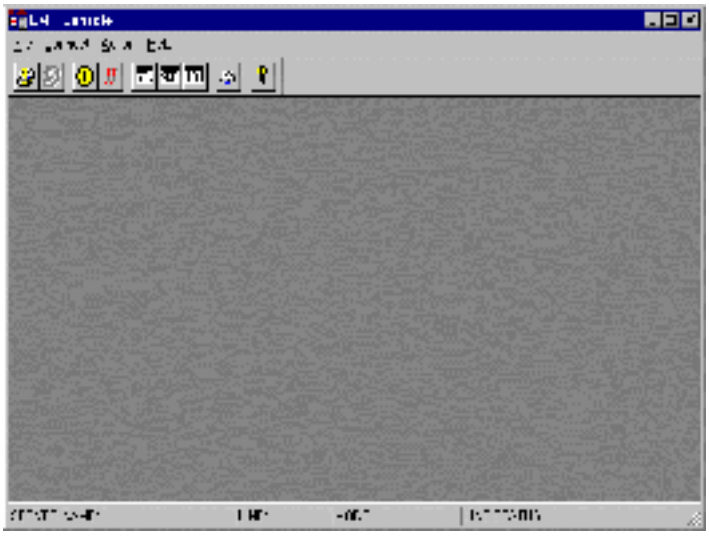
The Console Manager has a Phonebook, which you use to connect to a selected server.

Referring to the above figure, the Board Management Controller (BMC) in your server monitors system management events and logs their occurrence in the System Event Log (SEL). These include events such as over-temperature and over-voltage conditions, fan failure, or chassis intrusion. To enable accurate monitoring of temperature, voltage, etc. independent of an event, the BMC also maintains Sensor Data Record for each sensor (SDR), from which sensor information can be retrieved.

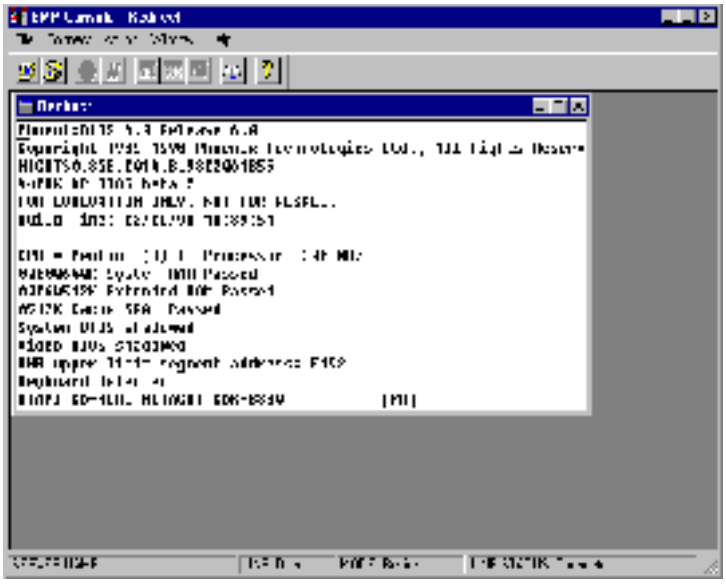
How the EMP Works

The EMP shares use of the COM 2 port with your system. When the EMP has control of the port, the port operates in command state. When the system has control of it, the port operates in redirect state. When connecting to a server, the EMP checks to determine the current COM 2 port state. The following discussion covers how the EMP functions in each state:

- *Command state* is the default COM 2 state. In this state, the EMP communicates with the server's firmware, allowing the client to remotely reset or power the server up or down. The client can also view the server's System Event Log (SEL), Field Replaceable Unit (FRU) information, or Sensor Data Record (SDR) table.
- In *console redirect state*, the EMP serves as a PC ANSI terminal window for BIOS console redirection. Commands typed in this terminal window are transmitted through BIOS to the server's console, and text displayed on the server console are displayed on the EMP Console's terminal window. With the EMP in this state, you can remotely view boot messages, access BIOS setup, and run DOS text mode applications through the EMP Console's terminal window.



EMP Console in Command State



EMP Console in Redirect State

The above figure shows the EMP Console window in redirect state with the terminal window. The text that appears on the server monitor displays in the redirect window.

Availability of the various EMP Console features is determined by two things: the EMP access mode selected during configuration in the System Management Submenu of the BIOS Server Menu, and if the server's COM 2 port is configured for console redirection in BIOS. The three EMP access modes are disabled, pre-boot, and always active.

EMP Console Access Modes (Server Configured for Console Redirection)

Mode	Server is powered off	During POST	After OS boots
Disabled	Redirect window appears, but is blank	Redirect window	Redirect window
Pre-boot	EMP commands available	Redirect window*	Inactive redirect window
Always Active	EMP commands available	Redirect window*	EMP commands available

*The operation mode can be modified by selections in the post reset and post-power-up dialogs. These are server control dialogs available with the EMP Console.

EMP Console Access Modes (Server not Configured for Console Redirection)

Mode	Server is powered off	During BIOS POST	After OS boots
Disabled	Redirect window appears, but is blank	Redirect window appears, but is blank	Redirect window appears, but is blank
Pre-boot	EMP commands available	EMP commands available	Redirect window appears, but is blank
Always Active	EMP commands available	EMP commands available	EMP commands available

EMP Requirements and Configurations

This section outlines the requirements and configurations necessary for using the EMP Console.

Operating Systems:

- Windows 95 or Windows 98
  - 16 MB of RAM, 32 MB recommended
  - 20 MB disk space
- Windows NT
  - Windows NT 4.0 or later
  - 24 MB of RAM, 32 MB recommended
  - 20 MB disk space

Client Configuration: The EMP will support all COM ports on the client system, along with any Windows NT/95 compatible modem.

Server Configuration: The EMP requires the server's COM 2 port to be connected to an external modem or directly connected to a serial cable.

Direct Connect Configuration: A null modem serial cable is needed. Connect one end of the cable into the COM 2 port of server and the other into a port on the client machine.

Modem Configuration: On the client, the EMP Console uses the Windows Application Program Interface (API) to determine if a modem is connected and available. The EMP Console does not configure the modem; it should be preconfigured through Windows.

For modem support, the server must use a Hayes compatible that supports a baud rate of 19.2K. The modem must be on the Windows 95 or NT Hardware Compatibility List provided by Microsoft. The server modem must be set in auto-answer mode for the EMP to be able to connect to it.

Setting Up the Server for the EMP

To use the EMP, you must configure the server's BIOS with specific settings. These settings take place in two submenus of the BIOS Server menu, the System Management Submenu and the Console Redirection Submenu. The earlier BIOS settings section shows all available options. This section focuses on those settings that must be configured to use the EMP.

System Management Submenu

All EMP related settings occur from the System Management Submenu of the Server main menu. Change only the items below; all other default settings should remain the same.

EMP Password Switch & EMP Password: Anytime you attempt to initiate a connection, a prompt for the user password appears. If you never set up the EMP password, anyone can access the EMP by clicking OK through the password prompt.

In the EMP Password area of the System Management Submenu, the EMP Password Switch option must be set to enable. Then type in a password of up to 8 alphanumeric characters. If a beep is heard, the password was accepted.

EMP Access Modes: Choose either Disabled, Pre-boot, or Always Active, depending on the type of EMP access needed. The tables above show what is available with a given setting.

EMP Restricted Mode Access: Set Restricted Mode to either enabled or disabled as needed. If in enabled mode, this means that the EMP Console's server control options, Power Off and Reset, are unavailable, except power on. In disabled mode, these same server control options are available.

EMP Direct Connect/Modem Mode: Select Direct Connect if a null modem serial cable directly connects the server's COM 2 port to the EMP Console client machine. If they are connected via a modem, select Modem Mode.

Console Redirection Submenu

These settings in the Console Redirection Submenu of the Server menu must be set exactly as noted to be able to use the EMP.

COM Port Address: Select 2F8. This is the COM 2 port that must be used by the EMP. The IRQ# setting automatically populates with the correct number based on the COM Port Address choice.

Baud Rate: Select appropriate speed.

Console Type: Choose PC ANSI.

Flow Control: Choose CTS/RTS + CD.

Main EMP Console Window

The main EMP Console window provides a graphical user interface (GUI) to access server control operations and to launch the management plug-ins from. At the top of the GUI is the menu and tool bar. These provide the options to initiate plug-ins and other support features. A status bar at the bottom displays connection information like server name, line status, and mode.

Toolbar

The tool bar buttons of the EMP main window combine server control and management plug-in options available from the Connect and Action menus as follows:

Generates the Connect dialog to allow connection to a selected server.

Disconnects from the currently connected server.

Generates the Power On/Off dialog.

Generates the Reset dialog.

Launches the SEL viewer.

Launches the SDR viewer.

Launches the FRU viewer.

Opens the phonebook.

Opens the online help.

Status Bar

The status bar displays at the bottom of the current window. It contains the following status information:

- **SERVER NAME**: the name of the connected server (stored in the Phonebook) when connecting via modem.
- **LINE**: the type of line connection. This would be either direct or modem.
- **MODE**: either Redirect of EMP, depending on whether the EMP has control of the COM 2 port.
- **LINE STATUS**: gives status information on the server connection. For example, if a server is connected, the status bar says "Connected." Otherwise, the line is blank.

EMP Console Main Menu

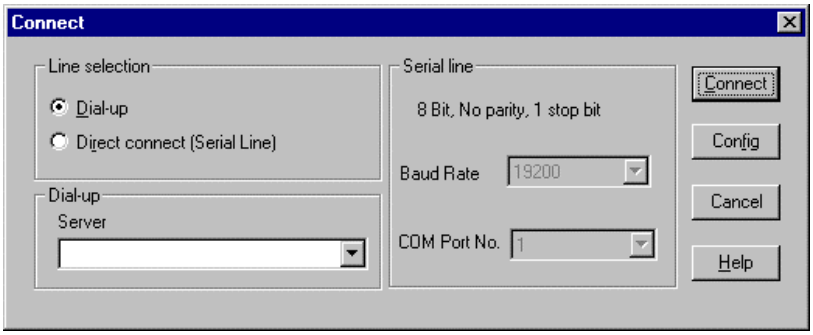
- **File**
  - — **Exit** - Exits the EMP Console.
- **Connect**
  - — **Disconnect** - disconnects the server connection.
  - — [Re]Connect - raises the connect dialog.
  - — A list of the five most recent connections - can click on one of the five servers most recently connected to. A connection to the selected server is initiated.
- **Action**
  - — **Power On/Off** - powers the server on or off with post-power-up options.
  - — **Reset** - opens the Reset dialog.
  - — **SEL Viewer** - opens the SEL viewer.
  - — **SDR Viewer** - opens the SDR viewer.
  - — **FRU Viewer** - opens the FRU viewer.
  - — **Phonebook** - opens the phonebook dialog.
- **Help**
  - — **Help Topics -** help topics for EMP Console.
  - — **Help About** - provides version information.

Server Control Operations

Three server control operations are available from the menu or toolbar of the main EMP Console window, remote server connection, powering the server on and off, and resetting the server. The server console mode can also be switched between EMP active and BIOS redirect modes through post-power-up and reset options.

Connect

When you select [Re]Connect from the Connect menu, the Connect dialog allows you to connect to a selected server. If the client machine is already connected to a server, initiating connection generates a warning message. It lets you know that the existing connection will be terminated if you continue trying to initiate the new connection. You are prompted to enter the EMP password whenever a connection is attempted.



Connect Dialog

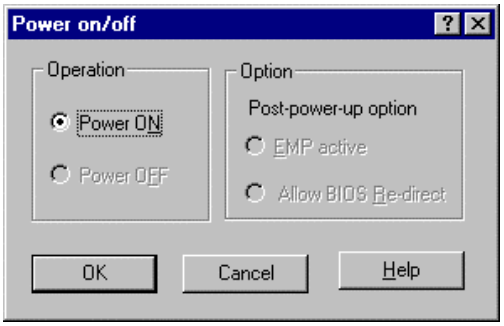
Options available in the dialog are:

- **Line Selection** - you can specify whether to use a direct connection or dial-up modem connection to the server.
  - — **Dial-up** - connects to a selected server with a modem.
  - — **Direct connect (Serial Line)** - connects to the selected server directly using a null modem serial cable.
- **Server** - you can select or enter a server name from a dropdown edit list box of available servers. A server must be selected when the line selection is Dial-up.

- **Serial Line** - must be filled out when the line selection is set to Direct connect (Serial Line).
  - — **Baud Rate** - must be 19200 for EMP to connect properly.
  - — **COM Port No.** - set the COM Port number to which the null modem serial cable is connected.
- **Connect** - initiates connection to the connected server. When this button is clicked, you are prompted for the EMP password.
- **Config** - displays the Phonebook dialog.
- **Cancel** - exits the Connect dialog without any action taken.
- **Help** - displays dialog level help information.

Power On/Off

Selecting Power On/Off from the Action menu allows you to power the server on or off, with post-power-up options. It generates the Power on/off dialog.



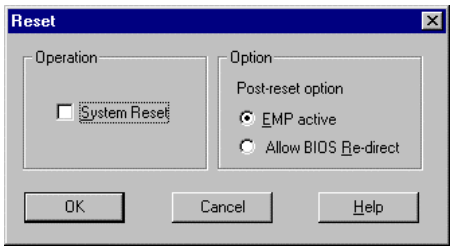
Power On/Off Dialog

Options available in the dialog are:

- **Power ON** - powers on the server.
- **Power OFF** - powers off the server. This option is not allowed if the server is configured in RESTRICTED mode for EMP operations.
- **Post-power-up option** - sets the mode selection of the server to EMP active or BIOS redirection. The setting is available after the next power-up. The default selection is EMP active.
- **Cancel** - exits the dialog without any action taken.
- **Help** - displays dialog level help information.

Reset

Selecting Reset from the Action menu generates the Reset dialog so that you can remotely reset the server with post-reset options.



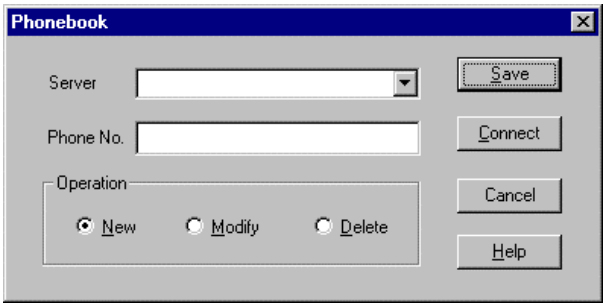
Reset Dialog

Options available in the dialog are:

- **System Reset** - resets the server with the selected post-reset options. This operation is not allowed if the server is configured in RESTRICTED mode for EMP operations.
- **Post-reset Option** - sets the post-reset option that will be effective after reset. The options are EMP active or BIOS redirection. The default selection is EMP active.
- **Cancel** - exits the Connect dialog without any action taken.
- **Help** - displays dialog level help information.

Phonebook

The EMP Console provides a support plug-in known as the Phonebook. The Phonebook stores names and numbers of servers in a list that can be updated by adding, modifying or deleting entries. The Phonebook can be opened from the main menu and tool bars, or launched from the Connect dialog by clicking the Config button.



Phonebook Dialog

Options available in the dialog are:

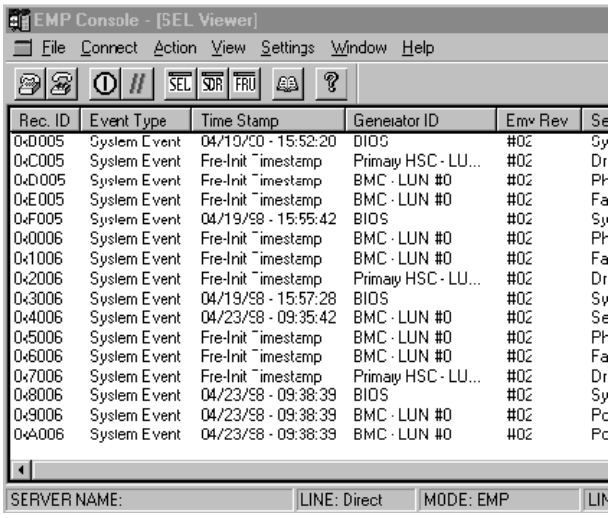
- **Server** - a dropdown list of server names previously stored in the Phonebook. If the New radio button is selected in the Operation area, this area is cleared.
- **Phone No.** - the number of the selected server. If the New radio button is selected in the Operation area, this area is cleared.
- **Operation**
  - **New** - lets you add a new entry in the phonebook. Selecting this option clears the Server and Phone No. Fields. You must click Save for the entry to be added to the phonebook.
  - **Modify** - lets you edit an existing entry. You select an existing entry from the Server dropdown edit box and modify the existing phone number before selecting this option. Click Save in order to store this entry in the phonebook.
  - **Delete** - lets you delete an entry from the phonebook. You must first select an existing server from the Server dropdown edit box before selecting this option. You must click Save for the entry to be deleted.
- **Save** - saves a new or modified Phonebook entry, or deletes an entry if the Delete radio button was selected.
- **Connect** - displays the Connect dialog with the server from the Phonebook's Server dropdown list box already populating the Connect dialog's Server field.
- **Cancel** - exits the Connect dialog without any action taken.
- **Help** - displays dialog level help information.

Management Plug-ins

SEL Viewer

The SEL viewer provides access to the System Event Log on the server and can display records in either hexadecimal or text (verbose) form. Options available through the SEL viewer (see the SEL Viewer figure below) are:

- View the SEL from a saved file
- Save the SEL to a file
- View SEL summary info
- View all SEL entries
- View SEL info by event type
- View SEL info by sensor type
- Set SEL display mode to either Hex or verbose mode
- Set the SEL output file format to either text or binary format
- Close the SEL viewer
- Exit the EMP


EMP Console - [SEL Viewer]
File Connect Action View Settings Window Help
SEL SDR FRU
Rec. ID | Event Type | Time Stamp | Generator ID | Emv Rev
0x0005 System Event 04/19/98 - 15:52:20 BIOS #02
0xC005 System Event Pre-Init Timestamp Primary HSC - LU... #02
0xD005 System Event Pre-Init Timestamp BMC - LUN #0 #02
0xE005 System Event Pre-Init Timestamp BMC - LUN #0 #02
0xF005 System Event 04/19/98 - 15:55:42 BIOS #02
0x0006 System Event Pre-Init Timestamp BMC - LUN #0 #02
0x1006 System Event Pre-Init Timestamp BMC - LUN #0 #02
0x2006 System Event Pre-Init Timestamp Primary HSC - LU... #02
0x3006 System Event 04/19/98 - 15:57:28 BIOS #02
0x4006 System Event 04/23/98 - 09:35:42 BMC - LUN #0 #02
0x5006 System Event Pre-Init Timestamp BMC - LUN #0 #02
0x6006 System Event Pre-Init Timestamp BMC - LUN #0 #02
0x7006 System Event Pre-Init Timestamp Primary HSC - LU... #02
0x8006 System Event 04/23/98 - 09:38:39 BIOS #02
0x9006 System Event 04/23/98 - 09:38:39 BMC - LUN #0 #02
0xA006 System Event 04/23/98 - 09:38:39 BMC - LUN #0 #02
SERVER NAME:
LINE: Direct
MODE: EMP

SEL Viewer

SEL Viewer Menu Options

The following menu options are found on the SEL viewer menu bar:

- **File**
  - **Open** - you can view SEL data from a previously saved file if it was stored in binary format. Selecting the Open menu item allows you to specify a filename under which the data is found. The default filename is "SELLOG.DAT." If the file cannot be opened, the program displays an error message.
  - **Close** - you can close the SEL viewer.
  - **Save** - saves the SEL events to a file in either binary raw or verbose text format. The binary file may be retrieved later. Once data has been saved to a file, selecting this option will save the data to the previously saved file. If no SEL events have been retrieved, then this menu option is not available.
  - **Save As** - saves the SEL events to a new file in either binary raw or verbose text format. The binary file may be retrieved later. Selecting this option lets you specify a filename to which the data will be saved. The default filename is "SELLOG.DAT." If no SEL events have been retrieved, then this menu option is not available.
  - **Exit** - exits the EMP.
- **Connect**
- **View**
  - **SEL Information** - displays SEL summary information as returned by the server.
  - **All Events** - displays all events in the SEL.
  - **By Sensor Type** - shows all events in the SEL generated by a specific sensor type such as voltage, temperature, etc. A submenu lets you select the sensor type to be displayed.
  - **By Event** - displays all the events in the SEL of a particular type; for example, by memory or threshold. A pop-up menu lets you select the event type to display. This pop-up menu displays all the event types that may be generated by the particular hardware.
- **Settings** - you can change several operating parameters for the SEL viewer. This menu displays the following suboptions:
  - **Display HEX/Verbose** - toggles between HEX mode and interpreted mode of displaying SEL records.
  - **Output Text/Binary** - determines whether SEL data will be saved to the file in binary format or verbose format.
- **Window** - gives options for displaying currently open windows.

- **Help**

  — **Help Topics -** help topics for EMP Console.

  — **Help About** - provides version information.

Sensor Type Codes

The Sensor Type Code Table provides information regarding:

- The type of sensor generating the SEL entry
- The name of the sensor
- The microcontroller which initiated the SEL entry
- The warning or error which initiated the SEL entry.

Using the Sensor Type Code Table

Compare the *Sensor Type and Number* message shown in the SEL viewer display (above) to the Sensor Type/Number in Verbose column in the table below. Using information in the *Sensor Name* column in the table you can determine the physical component which generated the SEL message. The *Generator ID* column in the table identifies the microcontroller which reported the event to the SEL. Detailed information regarding the event is available from the *Event Description* column in the SEL Viewer.

For example, if there is a Fan #10 entry in the *Sensor Type and Number* column of the SEL Viewer, by looking at the Sensor type Codes table you can determine that the Baseboard Fan 1 caused this entry. The entry was reported through the Baseboard Management Controller (BMC) on the system board.

Sensor Type Codes

Sensor Type and Number in Verbose	Sensor Name	Generator ID
Reserved	00h	BMC
Temperature #17	Processor1 Temp	BMC
Temperature #18	Processor2 Temp*	BMC
Temperature #19	Baseboard Temp1	BMC
Temperature #1A	Baseboard Temp2	BMC
Voltage # 01	Baseboard 5V	BMC
Voltage # 02	Baseboard 3.3V	BMC
Voltage # 03	Primary Processor	BMC
Voltage # 04	Secondary Processor*	BMC
Voltage # 05	Processor 2.5V	BMC

*Not applicable to all servers

Sensor Type Codes (continued)

Sensor Type and Number in Verbose	Sensor Name	Generator ID
Voltage # 06	5V Standby	BMC
Voltage # 07	Baseboard SCSI-A Term1	BMC
Voltage # 08	Baseboard SCSI-A Term2	BMC
Voltage # 09	Baseboard SCSI-A Term3	BMC
Voltage # 0A	Baseboard –12V	BMC
Voltage # 0B	Baseboard SCSI-B Term1	BMC
Voltage # 0C	Processor 1.5V	BMC
Voltage # 0D	Baseboard –5V	BMC
Voltage # 0E	Baseboard 12	BMC
Fan # 0F	Baseboard Fan0	BMC
Physical Security #26	Chassis Intrusion	BMC
Secure Mode Violation Attempt #27	EMP password (at the time of connecting to the server)	BMC
Secure Mode Violation Attempt #28	Secure Mode Violation (while the system is in Secure Mode)	BMC
Processor #1B	Processor1 Status	BMC
Processor #1C	Processor2 Status*	BMC
Memory # 1F	DIMM1 Presence	BMC
Memory #20	DIMM2 Presence	BMC
Memory #21	DIMM3 Presence	BMC
Memory #22	DIMM4 Presence*	BMC
Post Error #25	Refer to *Problem Solving – Post Error Codes and Messages*	BIOS
Watchdog #25	Watchdog Event	BMC
System Event #EF	See the System Event Logging Format Table	BIOS

*Not applicable to all servers

System Event Logging Format Table

Sensor Type and Number in verbose	Sensor Type and Number in hex	Event Description in hex	Event type	Event Description
System Event #EF	12 EF	E7 01 -- --	System Boot Event	System Boot Event …
System Event #EF	12 EF	E7 00 -- --	System Recognition	System Boot Event …
Memory #EF	OC EF	E7 20 -- --	Single Bit Memory Error	Correctable ECC …
Memory #EF	OC EF	E7 21 -- --	Double Bit memory Error	Non-Correctable ECC …
Memory #EF	OC EF	E7 02 -- --	Memory Parity error	Parity …
Critical Interrupt #EF	13 EF	E7 00 -- --	Bus Timeout	Bus timeout …
Critical Interrupt #EF	13 EF	E7 02 -- --	I/O Check	I/O Channel check NMI
Critical Interrupt #EF	13 EF	E7 03 -- --	Software NMI	Software NMI
Critical Interrupt #EF	13 EF	E7 04 -- --	PCI PERR	PCI PERR …
Critical Interrupt #EF	13 EF	E7 05 -- --	PCI SERR	PCI SERR …

SDR Viewer

The SDR viewer lets you view the Sensor Data Records retrieved from the SDR repository. Options available through the SDR viewer are:

- View all SDR records
- View SDR entries by SDR type
- View SDR summary info
- Set SDR display mode to either Hex or verbose mode
- Close the SDR viewer
- Exit the EMP

SDR Viewer Menu Options

The following menu options are found on the SDR viewer menu bar:

- **File**
  - — **Close** - closes the SDR viewer.
  - — **Exit** - exits the EMP.
- **View**
  - — **Display all Records** - displays all records from the SDR repository.
  - — **SDR Type** - displays the records of a particular SDR type. You select an SDR type from a pop-up menu that displays all the SDR types available for the given hardware.
  - — **SDR Info** - displays the SDR summary information as returned by the server.
- **Settings** - lets you change operating parameters for the SDR viewer. This menu displays the following suboption:
  - — **Display HEX/Verbose** - toggles between HEX mode and interpreted mode of displaying SDR records.
- **Window** - gives options for displaying currently open windows.
- **Help**
  - — **Help Topics -** help topics for EMP Console.
  - — **Help About** - provides version information.

FRU Viewer

The FRU viewer allows you to view the server's FRU (Field Replaceable Units) data from the server's baseboard FRU information area. Options available with the SDR viewer are:

- View all FRU records
- View FRU summary info
- Set FRU display mode to either Hex or verbose mode
- Close the FRU viewer
- Exit the EMP

FRU Viewer Menu Options

The following menu options are found on the FRU viewer menu bar:

- **File**
  - **Close** - closes the FRU viewer.
  - **Exit** - exits the EMP.
- **View**
  - **Display all Records** - displays all FRU data, which consists of chassis, board, and product information.
  - **FRU Info** - displays the FRU summary information as returned by the server.
- **Settings** - lets you change operating parameters for the FRU viewer. This menu displays the following suboption:
  - **Display HEX/Verbose** - toggles between HEX mode and interpreted mode of displaying FRU records.
- **Window** - gives options for displaying currently open windows.
- **Help**
  - **Help Topics** - help topics for EMP Console.
  - **Help About** - provides version information.

D

Platform Event Paging

Platform Event Paging

With Platform Event Paging (PEP), your server can be configured to automatically dial up a paging service and page you when a server management related event occurs. Platform events include temperature out-of-range, voltage out-of-range, chassis intrusion, and fan failure.

If PEP is enabled and the BMC receives or detects a new event, it automatically sends a page. It can send a page if the processors are down or if the system software is unavailable.

PEP needs an external modem connected to the server's EMP (Emergency Management Port) serial connection. This is typically the COM2 serial connector.

Using Platform Event Paging

1. Enter BIOS Setup. Refer to "Configuring Your System" in Chapter 3 of this User's Guide.
2. Enter the PEP Management submenu from the Server Menu.
3. Set the PEP Enable field to Enable.
4. Enter your page string in the PEP Page String field. This consists of the attention command for you modem (generally ATDT), the number of your paging service, several commas (each comma is a 1 second pause), the number/message you wish to appear on your pager, and the hangup command for your modem (generally ATH). You will need to experiment with the timing to ensure you are paged properly. Set the Send Test Page field to Send Test Page Now to generate a test page.
5. If you wish to filter events so that only certain events will originate a page, enter the PEP Filter submenu.
6. Set the PEF Enable field to Enable.
7. Enable all of the events about which you want to be paged.
8. Escape out of the PEP Filter submenu.
9. Set the time between pages with the Page Blackout Field. If you want to be paged every five minutes, set it to 5. The range is from 0 to 10 minutes.
10. Exit BIOS Setup.

Glossary

A

AC
(Alternating Current) The type of current available in wall outlets. All computers must convert alternating current to direct current to operate. See also DC.

address
A label, name, or number that identifies a location in computer memory.

ASCII
(American Standard Code for Information Interchange) A standard number assigned to each of the alphanumeric characters and keyboard control code keys to enable the transfer of information between different types of computers and peripherals.

B

backplane slot
A connector on the backplane board in desktop computers and expansion boxes that allows you to install circuit cards.

backup
A copy of data for safe-keeping. The data is copied from computer memory or disk to a floppy disk, magnetic tape, or other media.

backup battery
The battery in your computer that maintains the real-time clock and the configuration information when the computer's power is removed.

base memory
An area of memory between 0 and 640 kilobytes.

baud rate
The speed with which data is transmitted during serial communication. The computer's operating system and software program must be configured for the same baud rate as the communication device, such as a serial printer. See also bps.

BIOS
(Basic Input/Output System) A program stored in flash EPROM or ROM that controls the keyboard, disk drives, video monitor, and other devices. See also flash EPROM, EPROM, and ROM.

bit
Derived from BInary digiT, a bit is the smallest unit of information a computer handles. See also byte.

BMC
(Baseboard Management Controller) Contains all of the server management functions. One major function of the BMC is to monitor system management events and log their occurrence in the System Event Log (SEL).

boot
The process of loading the operating system into memory.

bps
(bits per second) The number of bits transferred in one second during serial communication, such as modem transmission.

byte
A group of eight bits.

C

cache memory
A very fast, limited portion of RAM set aside for temporary storage of data for direct access by the microprocessor.

CD-ROM drive
(Compact Disk ROM drive) A type of mass storage device that reads information from a compact disk.

Centronics port
An industry standard parallel port. See also parallel port.

CGA
(Color Graphics Adapter) A type of video display system that provides low-resolution text and graphics on TTL monochrome and color monitors.

CMOS
(Complimentary Metal-Oxide Semiconductor) A type of low-power integrated circuit used in computers. See also TTL.

COM1 or COM2
The name you can assign a serial port to set or change its address. See also serial port.

command
An instruction that directs the computer to perform a particular operation.

configuration
The way in which a computer is set up to operate. Some configurable options include CPU speed, serial port designation, and memory allocation.

coprocessor
See math coprocessor.

CPU
(Central Processing Unit) See microprocessor.

CRT
(Cathode-Ray Tube) The type of video display used in monitors for desktop computers.

D

DC
(Direct Current) The type of current available in the rechargeable battery packs used in portable computers. See also AC.

default
The factory setting your computer uses unless you instruct it otherwise. For example, when powering up, the computer will boot from the default drive.

density
The capacity of information (bytes) that can be packed onto a storage device, such as a floppy disk.

device driver
A software program that a computer must use to recognize and operate certain hardware, such as a mouse or a video monitor.

disk drive
A device that stores data on a hard or floppy disk. A floppy disk drive requires a floppy disk to be inserted; a hard disk drive has a permanently encased hard disk.

DOS
(Disk Operating System) See operating system.

DRAM
(Dynamic RAM) See RAM.

E

ECC
(Error Checking and Correction) A method of detecting and correcting errors.

EEPROM
(Electrically Erasable Programmable Read-Only Memory) A type of memory device that stores password and configuration information.

EGA
(Enhanced Graphics Adapter) A type of video display system that provides medium-resolution text and graphics on TTL monochrome, color, and enhanced color monitors.

EMP

The Emergency Management Port (EMP) provides an interface to the Console Manager. This interface allows remote server management via a modem or direct connection.

EMS

(Expanded Memory Specification) A method of accessing memory beyond the 640K limit of DOS by exchanging data in and out of main memory at high speeds. Some software requires EMS to operate.

EPROM

(Erasable Programmable Read-Only Memory) A type of memory device that is usually used to store system BIOS code. This code can be erased with ultraviolet light, but is not lost when the computer is powered off. See also flash EPROM and ROM.

expanded memory

See EMS.

expansion slot

See backplane slot.

extended memory

The protected memory above 1M that is directly accessible by the microprocessor through certain utilities and operating systems. This memory is used in computers with 80286, 80386, and 80486 microprocessors.

F

flash EPROM

A type of memory device that is usually used to store system BIOS code. This code can be replaced with updated code from a floppy disk, but is not lost when the computer is powered off. See also EPROM and ROM.

floppy disk drive

See disk drive.

format

The process used to organize a hard or floppy disk into sectors so it can accept data. Formatting destroys all previous data on the disk.

G

(Gigabyte)

1,073,741,824 bytes. See also byte.

H

hard disk drive
See disk drive.

hardware
The physical parts of your computer, including the keyboard, monitor, disk drives, cables, and circuit cards.

hot swap
A method used to insert or remove SCSI disk drives into or from an operating bus. This method is typically used in RAID subsystems. When used in non-RAID subsystems the operating system must typically be restarted.

I

IC
(Integrated Circuit) An electronic device that contains miniaturized circuitry.

(ISA Configuration Utility)
The program that you use to change the configuration of some ISA desktop computers. This program also contains information about the hardware in the computer.

IDE
(Integrated Drive Electronics) A type of hard disk drive with the control circuitry located inside the disk drive rather than on a drive controller card.

interface.
A connection between the computer and a peripheral device that enables them to exchange data. See also parallel port and serial port.

ISA
(Industry Standard Architecture) An industry standard for computers and circuit cards that transfer 16 bits of data at a time.

J

jumper
A small electrical connector used for configuration on some computer hardware.

K

(Kilobyte)
1,024 bytes. See also byte.

L

LAN
(Local Area Network) A group of computers linked together within a limited area to exchange information.

LCD
(Liquid Crystal Display) The type of video display used in portable computers.

LED
(Light-Emitting Diode) A small electronic device that glows when current flows through it.

LPT1 or LPT2
The name you can assign a parallel port to specify its address. See also parallel port.

LVD
Super-fast Ultra 2 SCSI Low Voltage Differential (LVD) Parallel SCSI Interface. A new SCSI interface that provides greater I/O bandwidth, device connectivity, data reliability, and longer cable lengths for Ultra2 SCSI hard disk drives. Note that in order to achieve LVD performance all devices including cable, controller, and drive must support LVD.

M

(Megabyte)
1,048,576 bytes. See also byte.

math coprocessor
An IC that works with the microprocessor to speed up mathematical calculations.

memory
The circuitry in your computer that stores data and programs. See also EMS, extended memory, RAM, and ROM.

microprocessor
The integrated circuit that processes data and controls the basic functions of the computer.

modem
A device used to exchange information with other computers over telephone or data lines.

module
A circuit board that plugs into a dedicated connector on the system board in your computer.

mouse
A small input device that you guide on a flat surface to control the cursor movement and operation of the computer when using certain software programs.

N

NVRAM
(Nonvolatile RAM) A type of RAM that retains its contents even after the computer is powered off. This memory stores EISA configuration information. See also RAM and SRAM.

O

operating system
A set of programs that provides the interface between other software programs and the computer.

P

parallel port
The connector on the back of your computer that allows the transfer of data between the computer and a parallel device, such as a parallel printer.

partition
The process of dividing the storage space on a hard disk into separate areas so that the operating system treats them as separate disk drives.

password
A security feature that prevents an unauthorized user from operating your computer. See also EEPROM.

PCI
Peripheral Component Interconnect. PCI is a high-performance peripherals I/O bus supporting data transfers of up to 132MB per second.

Pentium
A type of microprocessor, with a built-in math coprocessor, cache memory, and memory and bus controllers, that processes and communicates 32 bits of data at a time. This microprocessor also contains power management capabilities.

peripheral
A device connected to and controlled by the computer, such as an external disk drive or a printer.

pixel
The smallest element that is visible on a video display. The resolution of a video display system is measured in pixels.

PnP
(Plug-n-Play) Plug-and-play is the ability to plug a device into a computer and have the computer recognize that the device is there. The user doesn't have to tell the computer.

POST
Power-On-Self-Test.

R

RAM
(Random-Access Memory) A temporary storage area for data and programs. This type of memory must be periodically refreshed to maintain valid data, and is lost when the computer is powered off. See also NVRAM and SRAM.

real-time clock
The IC in your computer that maintains the time and date.

ROM
(Read-Only Memory) A type of memory device that usually is used to store system BIOS code. This code cannot be altered and is not lost when the computer is powered off. See also BIOS, EPROM, and flash EPROM.

RS-232C port
An industry standard serial port. See also serial port.

S

SAF-TE
(SCSI Accessed Fault Tolerant Enclosure) A specification for monitoring the state of the drives and enclosure environment (fan, power supply, temperature, etc.) using the SCSI bus to indicate faults.

save
To store information on a floppy disk, hard disk, magnetic tape, or some other permanent storage device.

SCSI
(Small Computer System Interface) An industry standard interface that provides high-speed access to tape drives, hard disk drives, and other peripheral devices.

SEL
(System Event Log) A record of system management events. The information stored includes the name of the event, the date and time the event occurred and data pertinent to the event. Event data may include POST error codes that reflect hardware errors or software conflicts within the system.

serial communication
Information sent sequentially, one bit at a time.

serial port
The connector on the back of your computer that allows the transfer of data between the computer and a serial device, such as a mouse, a modem, or a serial printer.

Setup program
The program that you use to change the configuration of some ISA desktop and notebook computers. This program also contains information about the hardware in the computer.

software
Programs with specific functions, such as word processing, data base management, communications, and operating system.

SRAM
(Static RAM) A temporary storage area for data and programs. This type of memory does not need to be refreshed, but it is lost when the computer is powered off. See also NVRAM and RAM.

SSU
(System Setup Utility) The program that you use to change the configuration of your system. This program also contains information about the hardware in your system and is used to read the System Event Log.

SVGA
(Super VGA) A type of video display system that provides very high-resolution text and graphics on analog color monitors.

system board
The main circuit board in your computer. It contains most of the connectors and ports.

T

tape drive
A type of storage device using magnetic tape.

TTL
(Transistor-Transistor Logic) A type of integrated circuit used in computers. See also CMOS.

V

VGA
(Video Graphics Array) A type of video display system that provides high-resolution text and graphics on analog color monitors.

Equipment Log

Use this equipment log form to record pertinent information about your system. You will need some of this information to run the System Setup Utility. Be sure to update the equipment log when you add options.

Record the model and serial numbers of the system components, dates of component removal or replacement, and the name of the vendor from whom the component was purchased. Be sure to record the same information for any components added to the system, such as hard disk drives, add-in boards, or printers.

Record the model and serial numbers of the unit and system baseboard. The model and serial numbers of the system unit are recorded on a label attached to the rear of the unit. The serial number of the system board is located along the left side of the board, near the PCI expansion slot covers.

The location of serial numbers on add-in boards, hard disk drives, and external equipment, such as video displays or printers, varies from one manufacturer to another. Literature accompanying these products should illustrate or describe the location of model and serial numbers.

Component	Manufacturer Name & Model	Serial Number (if available)	Date Installed
Server			
System Board			
Processor 1			
Processor 2			
DIMM Slot 1			
DIMM Slot 2			
DIMM Slot 3			
DIMM Slot 4			
Modem			
Diskette Drive A			
Diskette Drive B			
Tape Drive 1			
Tape Drive 2			
CD-ROM Drive 1			
Hard Disk Drive 1			
Hard Disk Drive 2			
Hard Disk Drive 3			
Hard Disk Drive 4			
Hard Disk Drive 5			
Hard Disk Drive 6			
Hard Disk Drive 7			
Optional RAID Controller			
Network Controller 1			
Network Controller 2			
Monitor			
Keyboard			
Mouse			
External Peripheral 1			
External Peripheral 2			

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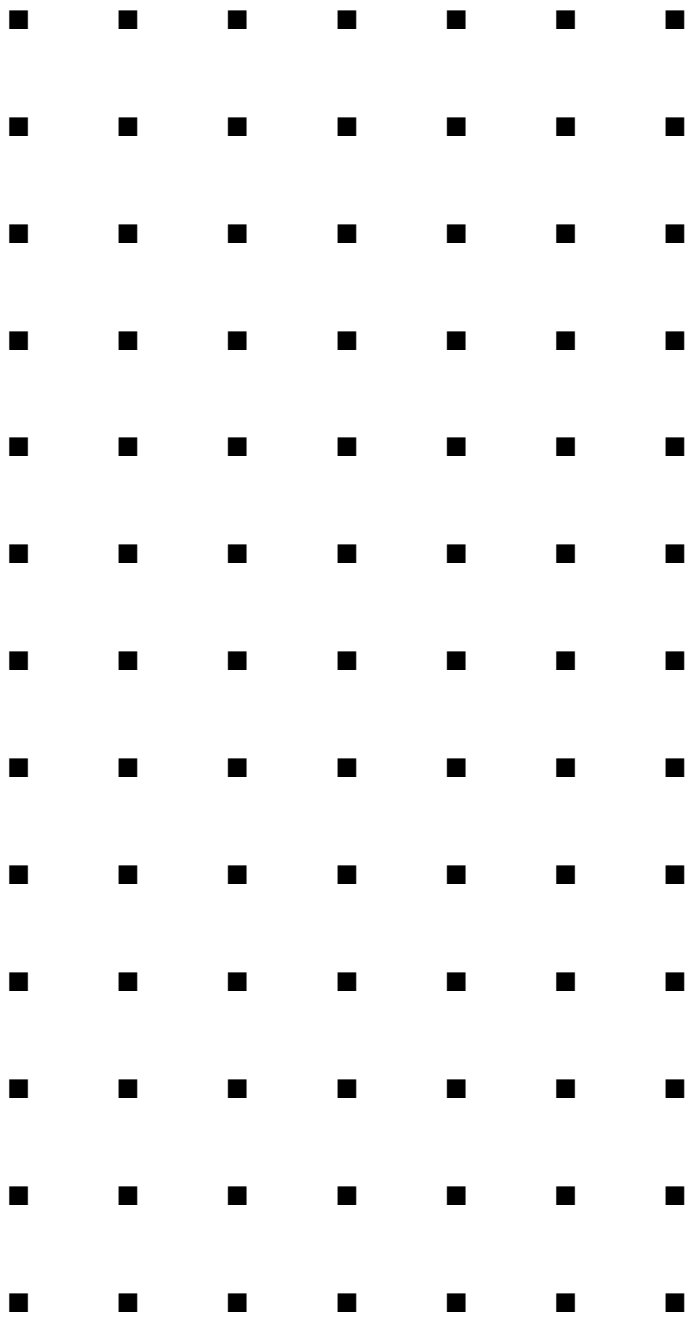

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